# SUPPLEMENT.


# The Mining Journal,

## RAILWAY AND COMMERCIAL GAZETTE:

**FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.**

[*The* MINING JOURNAL *is Registered at the General Post Office as a Newspaper, and for Transmission Abroad.*]

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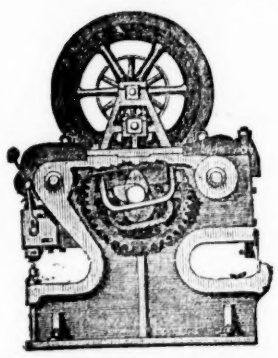

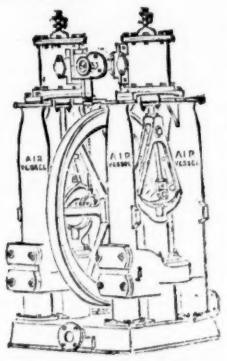

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PARIS, BRONZE MEDAL, 1867.

ORDER OF THE CROWN OF PRUSSIA.

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**A DIPLOMA**—HIGHEST OF ALL AWARDS—given by the Geographical Congress, Paris, 1875—M. Favre, Contractor, having exhibited the McKean Drill alone as the MODEL BORING MACHINE for the ST. GOTHARD TUNNEL.

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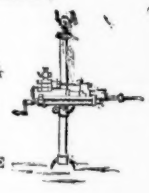

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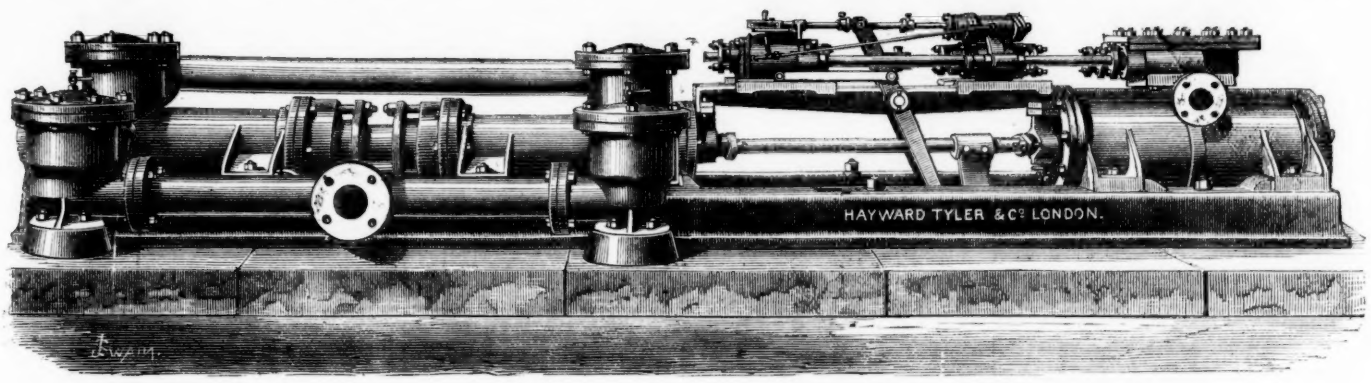


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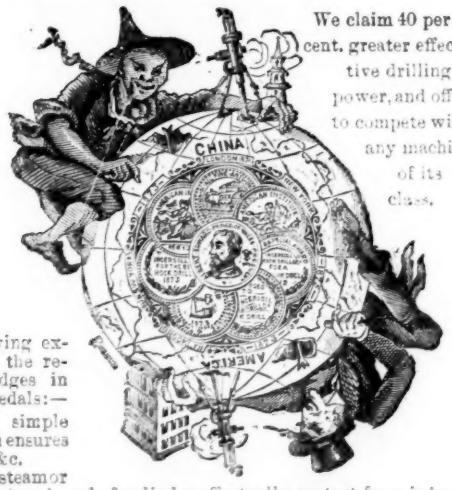


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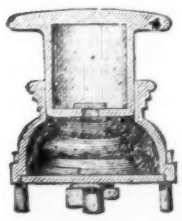

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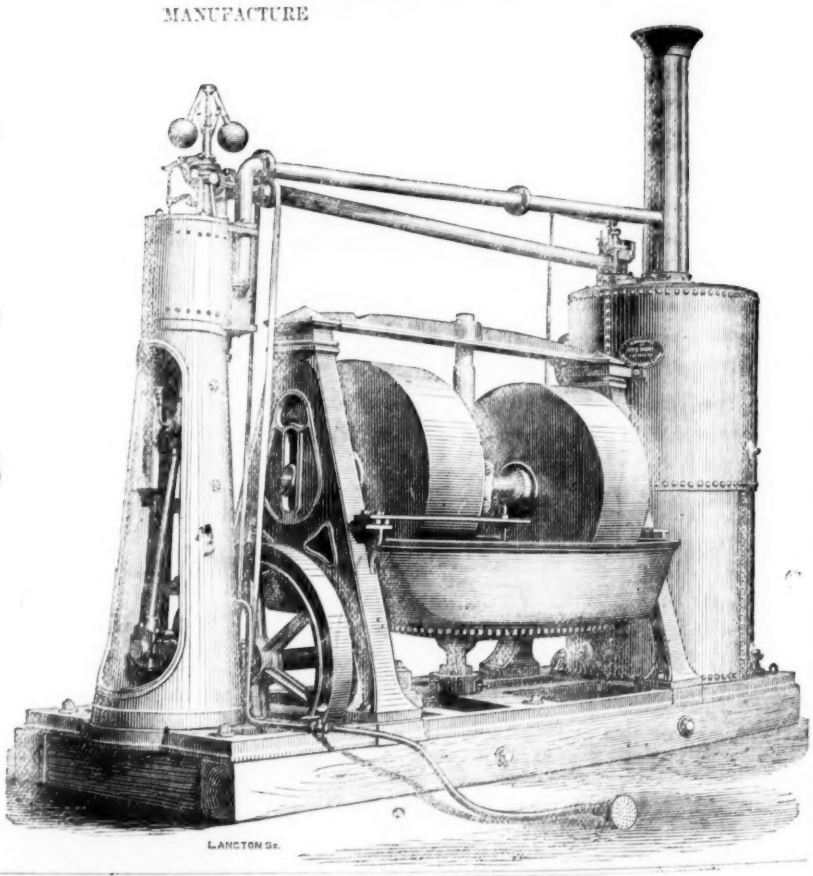


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## Original Correspondence.

### MINING IN COLORADO, SOUTH PARK—No. III.

SIR,—Unconformably reposing on the Silurians (described in the last chapter, No. 2) are heavy beds of Devonian limestone and calcareous quartzites; they are about 1000 ft. in thickness, their plane of deposition varies from 11° to 19°, usually to the eastward. The greater mass of quartzite lies at the bottom, which may be taken at 300 ft. thick at least; in this are found veins of silver-lead and copper. They appear to be fisures broken up through the horizontal strata from the great lodes and dykes in the older rocks below. As no development of any magnitude has yet been made upon them we know, therefore, but little of their value. All their courses are about north-east, and generally dipping to the north-west at angles varying from 60° to 85° with the horizon. Next comes the rich mineralised limestone, but these are interpolated with bands or thin beds of quartzite, and hard, vitreous, dark-blue siliceous lime, both being non-metalliferous. It is between these that the rich mineral-bearing strata occur. They are composed of baryta, calc spar, and soft, earthy, light blue argillaceous lime, and are impregnated throughout with silver, magnetite, carbonate of copper, and a little zinc-blende. There is but little sulphuret of iron, but occasionally small strings or veinlets of yellow copper comes in. The silver is a sulphuret, and nearly free from both antimony and arsenic, rendering it a most desirable ore for the smelter. The deposits, although of great extent, are very irregular, being entirely dependent on the structural arrangement of the floors, slides, heading-joints, faults, and dykes that traverse the formation, and as these arise from abnormal dislocations, the richest ore lies in angular pockets at or near their respective points of intersection. This body of associated limestone is about 400 ft. thick. Upon it lies heavy masses of unstratified igneous rocks, forming the main ridge of the range and peaks of Monts Lincoln and Bross—the former having an altitude of 11,450 ft. above sea level, or 4500 ft. above the Park at their base. It is composed chiefly of trachyte and porphyry, and carries no minerals of value. From whence it emanated is not known, but I believe from such observations that I have made that certain parts of the great dykes are the main vents of this great volcanic overflow. Its lithologic character is pretty uniform, the chief constituent is silica, of which it contains 80 per cent.; the remainder is hornblende, felspar, magnetite, and calcspar. It may be classed under two heads—the coarse variety and the fine. The former contains cubical and rectangular prisms varying in size from ¼ in. to 3 in. in length. All are trimetric where the crystal is unmodified; their structure is laminar, and composed entirely of ferruginous quartz. The fine variety is an aggregation of angular and irregularly shaped crystals of quartz in a greenish blue matrix of silicious lime, baryta, and hornblende, with a little felspar; quite homogeneous, excessively hard and brittle, and admissible of a high polish. The entire mass ranges from 400 to 700 ft. in thickness. I have not yet found any metallic minerals of value in this formation, but where the limestone comes in contact with the latter it is invariably rich in both copper and silver.

The GREAT MOOSE MINE is on Mont Bross, an extensive property, highly productive and very profitable. A recent estimate, made from a careful survey, shows over $700,000 worth of ore in sight. It is opened and operated by four chief cross-cut adit levels, the longest not exceeding 40 fms. in length. Through the centre of the mine runs a large fault in a south west direction; it is about 70 feet wide, and full of vertical crevices and lenticular vughs; some of them contain arborescent crystals of sulphate of lime, perfectly transparent and of the most fantastic shapes; the joints and sides of the fissures are often thickly coated with an efflorescent carbonate of copper. From the western side of this "fault" commences a well-defined floor cutting through the bed planes of the strata; in reality it is a great slide. It is undulating in its course, pitching from 18° to 38°. It is covered by several inches of a dolomite flookan, that has a striated polished surface, showing the direction of the downward movement of the superincumbent rocks. On it is found from 6 to 20 feet of mineralised ground, consisting of a light blue lime and sulphate of baryta, and is richest in silver. Where the latter is in excess and of a granular structure the rock in places is full of reticulated small string veins of crytaline gypsum associated with cross-heads of white magnesium clays; the ore may be classed as silver-lead. It is composed of gray copper, zinc-blende, magnetic, and a little sulphuret; the galena does not exceed 12 per cent. It carries from 40 to 400 ozs. of silver to the ton; selected samples often exceed 1000 ozs. I have never yet found any chlorides, but specimens of brittle silver and ruby are frequently met with. On the east side of the "fault" there is an apparent downthrow. The rocks are much dislocated, and the head and foot joints dip in several directions. They are also more indurated and siliceous. The baryta is of a coarser character. It looks as if they came from above nearer the porphyry. The ore, although of excellent quality, is not so abundant or continuous in the deposits; the ground, nevertheless, is very good for the production of silver below this mine, and nearly down on the bottom quartzite beds are other mines, belonging to the same company, known respectively as Dwyght Alps Hoosier, Rising Star, and others; the ore carries much more zinc, blende, sulphuret of iron, and lead, but with less silver, the first-class not exceeding 60 ozs. Some extensive surface excavations have been made in the early days of the silver discovery. There is plenty of ore, but unless it yields 100 ozs. little attention is paid to mines of this class. At the village of Dudley at the foot of the mountain, 3 miles distant, are extensive smelting and reduction works belonging to and operated by this company, but they cannot work half the ore that the mines are capable of producing. The following list is a few of minerals out of about 100 I have tested:—first-class ore, specific gravity 5·49, 400 ozs. of silver; second-class, specific gravity 3·21, 180 ozs.; third-class, specific gravity 2·95, 70 ozs.; fourth-class, specific gravity 2·88, 25 ozs. average; refuse ore, specific gravity 3·00, runs from 15 to 20 ozs, with some zinc, blende, iron pyrites, and yellow copper; blue porphyry, specific gravity 2·68; tractyte, 2·65; common limestone, 2·85; vitreous lime, 2·75; calcspar, 2·25; sulphate of lime crystalised, 2·36; quarts nearly pure, 2·93; quartzite, 2·74; baryta, 4·20; lead in the baryta, 6.25; green calcareous breccia, 2·50; hornstone, 2·65; black dolomite lime, 2·79; gneiss, 2·96; chalcedony, 2·20; felspar, 2·42; basalt, 3·00—this contains magnetite; green stone and epidote, 2·99; granites, all of which are of the concretionary order, 2·59; sandstones and compact grits run from 2·60 to 2·95. From the foregoing the reader may form an approximate estimate of the weights of both ore and the containing rock. My next will give some account of the Dolly Varden Mine, which has been the prize of the year, also its adjoining neighbour the Hyawatha.

CHARLES S. RICHARDSON, G.M.E.

*Alma Park County, Colorada, Nov.*, 1876.

### MINING IN COLORADO.

SIR,—Silver mining is looking well in Clear Creek County, the Pelican and Dives producing a large amount of ores, and is about to be consolidated and sold. The Terrible Mine is yet at a standstill, but the West Terrible, supposed to be owned by Messrs. Chaffee and Hamill, is worked by a large force of men. Messrs. Chaffee and Hamill offered to sell this to the Terrible Company for 70,000*l.*—5000*l.* down, and give them ten years for the balance. This would give the Terrible Company all the ground west they would require, and also give them the Brown Mine, about 300 ft. above the Terrible, which is as good as the Terrible, and some other lodes that are not much developed. Boulder County is producing some very rich ores, 1 ton was sold a few weeks ago for $80,000. The Red Cloud Mine, in the same county, is bonded, and expected to be sold in Germany; it is very rich for gold.

How about the Hall Valley Company? I saw in the paper a few days ago that the old property is about to be sold by the sheriff. That was an unfortunate affair for the English company. The Whale lode, I believe, is worthy of a trial if managed in a miner-like manner, which it never has been. Contracts have been let on the Whale Mine for raising mineral by the ton, and I have heard of tons of rock being buried up with a little mineral, and then estimated at so many tons, get their money and leave. If that is the way the Hall Valley Company's mines have been managed, it is no wonder English companies have been unsuccessful here; and I fear they will never find it any other unless they manage their affairs differently. The representatives of English companies come here and get acquainted with Messrs. So-and-so, and think all they say is gospel; but I can assure you that we have a set of men hanging round the hotels here expecting to meet someone who wants to buy mining property, at the same time they are nothing but the merest speculators, and the property they have to sell is too often worthless. Those middle-men are not the persons for companies to deal with; they must come down to the miners if they want safe investments—to the men who work and discover the lodes.

*Colorado, Nov.* 20. ——— A MINER.

### MINING IN THE EAST—No. X.

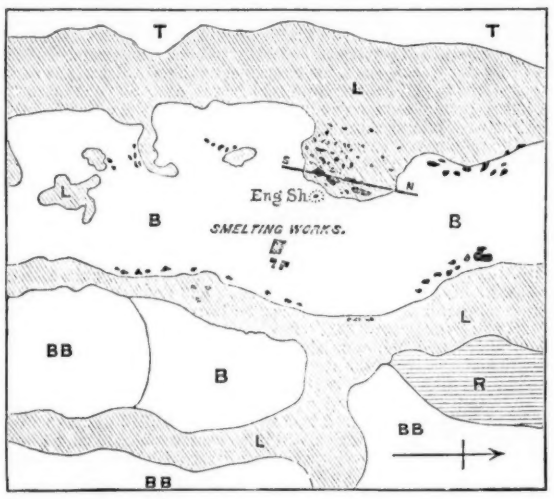
#### CUCHAINA LEAD MINES.

SIR,—The singular upheaval of banatite, which extends from Arad southwards across the Banat, passes the Danube near the Papagai, and prolongs itself in the same direction through a large portion of the Servian Principality; throughout its extension, as represented by the numerous bosses protruding through the limestone and mica schist, rocks of a most varied and unique description abound, replete with minerals, many of them being new and rare. The mineral district of Cuchania owes its existence to one of the protusions, which the proximity of the banatite to the surface, aided by subsequent denudation geologically recent, has permitted to show itself. This exposure of igneous rock is not of great extent, but its junctions with the lime rock have given rise here, as in the Banat, to various contact deposits which contain principally ores of lead and zinc.

The associated rocks are to the east syenite—granite, and to the west buntersandstein; the latter near its junction with the banatite approaches the texture of quartzite; through this sandstone small courses of the igneous rocks have forced themselves occasionally, but are unaccompanied by ores. Between the granite and the triassic variegated sandstones range the banatite, and overlying all these rocks are irregular bands of jurakalk, from 100 to 300 yards in breadth, which, though connected by ramifying branches, assume a general meridional direction; these bands usually occupy the elevations, and the escarpments, some of which are very fine, render them conspicuous. There is nothing unusual either in the appearance of the granite or the buntersandstein, and the compact limestone, of a light sienna tint, weathers in the usual jagged manner peculiar to such rocks when partially metamorphosed. The banatite is considered by Prof. Szabo a trachyte, and it presents at Cuchaina many novel and interesting characteristics, and though in depth it is solid and hard, it is extremely sensitive to atmospheric influences, so that it is difficult to obtain a perfect specimen.

Owing to the surface being much concealed beneath forests and pastures, it is only on some steep declivities that these rocks can be observed, but there appears to prevail three varieties—a compact hard rock, usually found in depth, consisting of a felspathic paste, with sparsely scattered hornblende crystals, which does not readily decompose; a crystalline agglomeration of felspar and hornblende in a felspathic cement, with crystals of glassy quartz; and, lastly, a granular base of felspar, containing innumerable double pyramidical crystals of quartz from ¼ to ½ in. in length, equally dispersed through the rock, with less numerous crystals of hornblende; this variety disintegrates with amazing rapidity. Superimposed on these trachytic varieties, and extending over a large part of its surface, is a trachytic tuff or agglomeration of fragments, pebbles, &c., derived from the adjacent rocks, embedded in a felspathic mud, resulting from the decomposition of the banatite; this tuff is of very recent deposition, and is of the same age as the recent strata found along the valley below. The igneous rocks due to the upheaval are of no great expansion, consequently the low energy of the eruptive action has been insufficient to produce on the surrounding strata those metamorphic changes which the extensive domes of similar rock in the Banat were capable of effecting.

The accompanying plan, drawn at a scale of 2 in. to the mile, defines the horizontal extension of the strata:—

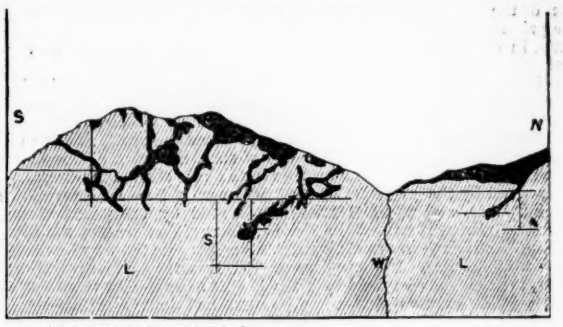



L.—The diagonal lines represent limestone.
B.—Banatite—trachyte and trachyte tuff.
B B.—Syenite—granite.
T.—Triassic variegated sandstone.
S.N.—Line of section: The cavities from which ores have been extracted, and the bingens are marked black.

THE ORE DEPOSITS.—If one may venture to judge from the disturbed appearance of the surface to the south-west, the mining district of Cuchania must in former times have been widespread; as, however, the surface is obscured by copse wood and pastures, it is difficult to define the district, or to decide whether there may not be other points in the neighbourhood where bosses of banatite may be found; this can only be determined by an examination of considerable length. The records extant always refer to the old mines at the warm baths, and without doubt all operations have for the past three centuries been limited to them. No veins of mineral or gangue exist here, but the deposits are found near the contact of the lime rock with the banatite in nests or masses closely contiguous to the junction, or filling caverns, cracks, and windings in the Jura limestone. The present mining operations are carried on in the boss of lime rock which contains the mine so often re-opened, whose position is indicated on the plan by the Barbara shaft; it rests on the trachyte, which has disrupted and penetrated it in every direction, and the hollows and fissures thus formed have subsequently been increased by subterranean rivulets of water containing free acids. That which particularly engages the attention of the observer is the immense extent of the old shoadings and workings of former ages, and this is not merely confined to the surface, for the interior of the hill has been ransacked through its entire extent during the lapse of centuries by the persevering miner.

As already mentioned, the mine produces principally the ores of lead and zinc, containing always a percentage of the precious metals. The lead ores are invariably rich, but those of zinc are often poor in gold and silver, thus immense quantities of galmei still remain in the surface deposits, or lying on the adjacent burrows.

The following section through the principal workings will serve to explain the manner in which the caverns and swallets occur, but can give but a faint idea of the complex ramifications which the long continued percolation of water has eroded throughout the lime rock. It has been drawn at a scale of 500 ft. to an inch:—




L.—The Jurakalk is shown by diagonal lines.
S.—The Barbara or engine-shaft.
W.—Hot well 68° Fahr.

The cavernous deposits have been reached by long tunnels driven in from the valley, and are then employed by lateral galleries, or by following the swallets themselves where practicable. There is considerable daily excitement in pursuing these leads, as no guide is recognised by which the nests and larger cavations may be discovered, consequently the miners are on the *qui vive*, all anxious to discover a large deposit, which is always of great value. The last one found contained several thousand pounds worth of auriferous ores.

The whole of the caverns, swallets, nests, threads, &c., have been pretty well exploited down to the level of the Nicolai Stollen, and the present adventurers are, therefore, piercing as rapidly as possible by means of rock-drills the 40 fm. level, which will at no distant date be communicated with the Nicolai shaft, and thus enable the miners to explore the deposits down to that depth. This is a most important point to achieve, as rich shoots of ore continue below the adit level (*vide* section), and when this communication has freed the workings of water all the rich pitches lost by its influx can be resumed. In all probability many hundreds of years have elapsed since the vast gunnises at and near the surface were worked out, and a rich harvest gathered. Large quantities of galmei still remain both in the hollows and burrows, from which it would appear that the masses consisted of vughy incrustations. These ores are rich in zinc in all the accumulations near the surface, containing 55 per cent. of silicate, but being only slightly argentiferous they have not been utilised. Below this the galmei is much mixed with iron ores, and its value for zinc is reduced more than half.

At lower depths in the body of the mountain the character of the deposit is much changed, for whilst the ores above described appear to have been formed *in situ* from decomposing sulphides, the inferior hollows are filled with a heterogenous mass of incoherent iron oxides, in the midst of which are irregular shales of stalactitic calamine and fortuitously scattered nodules and boulders of galena, worn into many strange shapes. These kind of deposits continue down to the lowest workings with little variation, and there can be no doubt that the whole contents of the caverns and swallets owe their position to the carrying power of water aided greatly by gravity.

Some may take exception to this opinion, and point to the fine concentric incrustations which in many hollows favourable conditions have permitted to form. These have, however, been formed subsequently to the deposition of the debris by the attraction of the calcareous rock; this action is set up in most cavernous accumulations, containing minerals in a fine comminuted condition, and partially soluble. In these cavities there is always present next the limestone a film of clay, which probably is due to the constant creeps of water about the rock, preventing the collection there of mineral. The debris washed into these places consists principally of a somewhat muddy body of red oxides of iron, with lime, zinc, &c. The reactions ensuing eliminates in this case the zinc, and deposits it as an incrustation next the clay lining, leaving in the centre a mass, which on account of its colour has been called braüning by the German miner; this often contains nodules of galena varying from 1 lb. to 1 cwt. This sulphide of lead is both auriferous and argentiferous, containing in 1 ton of ore from 20 to 50 ozs. of the latter, and from 0·25 up to 3 ozs. of the former. In cavities comparatively isolated and of no great extent these concentric layers are produced with some appearance of regularity, but usually the zinc incrustations are deposited confusedly, and the nodules thrown down capriciously.

Some of the gunnises and caverns are of vast dimensions, and one of them, the Angelina Zeche, will repay the perils of a descent. Starting from the engine-house in the valley the entrance is reached after a severe scramble over the inequalities caused by the infinite number of stockwerke and bingens, accompanied by immense burrows of attle. This point attained, a rest of a few minutes is ordered, to cool the system before plunging into the cold damp chambers of the limestone. The old shaft, or rather fissure, is barely practicable, but it is faced courageously, and after an amusing and energetic display of gymnastic evolutions of the most complicated nature the bottom of the rocky pass is found. Then crawling through the smallest of levels, *nez aux gmoux*, the cavern of centuries is entered with a slight shiver of alarm; before, above, below, to the right and to the left, the eye finds no relief from the blank and apparently illimitable blackness. The party with wary advance creep into space, and the whole of the berglampen shed their flickering light around, which, though powerless to irradiate the depths of the cavern, reflect innumerable glistening points from the pendant stalactites—a minature firmanent, studded with myriards of stars of every magnitude. Staglamites are not well represented, as the bottom consists of loose rubbish at an uncomfortable angle, rendered dangerously slippy by the wet carbonate of lime which continual droppings from the stalactites have deposited on it. As we stood silently contemplating the strange scene, surrounded by the berglente, picturesquely clad in the serviceable costume prescribed by the Austrian Code des Mines, thoughts of days in the remote past, when the ancient miners were fashioning this cavern crowded on us, and a host of curious enquiries suggested themselves. With what tools did the miners of those times labour? What language did they speak? Were they freemen, cheerfully toiling under the light of domestic happiness, or were they slaves, sweating under the grinding tyranny of the lash? Who can say what cruelties and loss of human life the excavation of this spacious cavern may not represent? We left the Zeche with spirits rather damped by these reflections, and were not sorry to quit the subterranean world and greet again the cheering light of day.

As may be gathered by consulting the sketch, small deposits of mineral exist along the junction of the limerock with the trachyte, but although many trial shafts have been sunk by the "old men," and exploratory tunnels driven recently, no accumulation of ores of importance have been discovered, though many nests, pockets, &c., have been opened, which contain galena, white carbonate of lead, and earthy manganese, and in one spot some quartzose silver ores. As usual in the ores which owe their position to the protrusion of the banatite all the minerals contain a percentage, often very low, of gold. The singular situation of these minerals, and the purely accidental way in which they have been amassed, have led to various suggestions as to their formation in the erosions of the limerock, but a careful examination of the associated rocks and their relative position will convince the geologist that their genesis is neither obscure nor even uncertain. We must go back far into the past, before the banatite had suffered so extensively from denudating action, and when the limestone boss was not yet laid bare, to indicate the position which the now altered ores then occupied. Superimposed on the limerock along the line of extensive gunnisses excavated by the "old men," the primary deposit of gangue, containing the sulphides of zinc, lead, and iron, must have occupied a considerable space between the banatite to the east and the buntersandstein on the west. Then, when denudation exposed the deposit and brought it under the influence of the atmosphere disintegration set in, and continued during the countless years required to remove the large mass of

banatite, limerock, and gangue, whose debris has principally contributed to the masses of trachytic tuff which has so largely overlaid the banatite in the valley immediately below. This disaggregation of the associated strata, proceeding *pari passu* with the decomposition of the sulphides, has resulted in the complete disappearance of the primary deposit, and in the accumulation of its metallic contents, in ores with difficulty decomposed, in the cavations of the metamorphosed limerock below.

It is well known that the association of the three sulphides—blende, galena, and iron—is, especially in calcareous rocks, often repeated, and we have examples that their decomposition gives birth to minerals similar to those found in this mine. Once open to the action of water, these changes in the presence of such minerals, enclosed in felspathic rocks, are certain to eventuate; this change is generally determined by the presence of pyrites, which passes into peroxide and sulphate, and the latter being absorbed by the percolations caused by rain throughout the deposit, ferruginous waters are distributed through the surrounding strata, and prepare the way for more important changes. It is unnecessary to follow the various reactions which the ores may have undergone; it will be sufficient to note the results—the peroxide of iron has been washed down and deposited as granular brown iron ore, whilst the sulphate has given rise to a muddy precipitate mixed with it.

The presence of alkaline silicates derived from the banatite allowed of the formation of smithsonite and calamine, whilst the galena, not being easily acted on, fell down in rounded fragments, and found their resting places by accident. The surface gunnises must have held the most valuable portion of the deposit; here the galmei was nearly pure, and was evidently formed *in situ*, and the considerations above induce one to believe that the major portion of the lead ore must have remained in these hollows. In depth, at the junction of the eruptive rocks with the limestone, much blende is met with of a dark reddish brown, and accompanied by pyrites. Besides the minerals mentioned, cerusite and anglesite, both massive and in crystals, are found in small quantities. There can be little doubt that secondary deposits of this description are commercially of greater valne than when worked in their original state, as the large quantities of gangue and rock become eliminated, and the ores are extracted and piled, dressed by nature to a saleable percentage; the only preparation they receive is passing them through a small Blake's crusher. The ores are then packed into small sacks, weighed, and expedited to Freiberg, where they are sampled and sold to the Government Reduction Works.

A large and conveniently fitted zinc and lead smelting works, which were erected by the Vienna company, and in which they smelted the ores, under the superintendence of Herr Felix Hofmann, has been long in disuse on account, it is said, of the serious loss of lead and gold. A very large percentage of vaporised lead was discharged into the atmosphere, whilst the slags contained also lead, which carried with it the precious metals. The ores do not seem difficult to reduce, and although for the present the management may deem it advisable to sell those raw ores which are highly valuable on account of the contained gold and silver, yet the immense masses of rich zinc ores holding a smaller percentage of the precious metals would probably be more profitably smelted on the spot. There are also immense quantities of ores lying on the surface, which, containing but a small amount of gold, are yet rich in zinc, but it is impossible to utilise them owing to the cost (45s. per ton) of transport; these would most certainly pay for smelting, with ores assaying 50 per cent., and spelter at 20*l*.

On the success attending the piercing of the 40 fm. level depends the future of the Cuchaina Mines, should the deposits opened by its means at all equal in capacity those above. The value of the ores (30*l*. to 40*l*. per ton) would quickly ensure a splendid success.

*Drenkova, Oct.* 20. EMPRESSARIO.

## NEVADA MINES—DEPRECIATION OF SILVER, &c.

Sir,—Having spent several years on the Pacific Coast as a miner, I have felt interested with the occasional notes in your valuable Journal on the above subject, and have many times wished that someone more able and intimately acquainted would enlighten your numerous readers on the prospects, &c., of these truly celebrated mines on the Comstock Lode. In the years of 1862, 63, 64 the excitement on that side respecting the immense riches of the Ophir, Gould and Curry, Mexican, and Savage Mines—all on the Comstock Vein—was quite equal to that of the present day about the Virginia Consolidated riches, but what has been the result?

Herewith you will find a longitudinal sketch, prepared from memory (not having access to plans or measurements on the spot), which gives the situation of the five mines named, with an outline of the great bonanzas, and the respective depths of each concern as well as recollected, my chief object being to point out the Consolidated Virginia in connection with the Gould and Curry. At the last-named mine the northern ground, for a great depth up and down against the boundary of Virginia, is said to be barren of mineral, and as long ago as 1873 the 2000 ft. level was driven north *(see plan)*, without any payable ground being struck, whilst it is well known that all the workings below the 2000 ft. level in the Gould and Curry have proved a disappointment, added to which the company have sunk immense sums, without any, or little, returns. In fact, this mine is a failure in depth, and being so much deeper than the Consolidated Virginia, I have generally thought it will, in some measure, serve as a data for a careful observer to form some opinion of the future value of the present rich mine—Consolidated Virginia. As a rule all the rich bonanzas have dipped southerly, and consequently, if the present immense one is not an exception to the general rule, some signs of it should be seen in the Gould and Curry long since, but from all accounts this is not the case.

The upper part of the Gould and Curry was exceedingly rich, and the middle portion of the lode very easy to excavate, whilst the sides consisted of harder rock, which was generally classed No. 2 quality ore, one bonanza alone yielding about $20,000,000 worth of mineral. At the surface the rich part of the lode was small, but in going down it widened out to 40 and 50 ft., and then again it thinned out in its downward course, and terminated in a mere branch, and barren for mineral, after which another deposit was struck, which yielded $7,000,000 worth of ore. The great Comstock Lode has a north and south direction, dipping east, on an angle of about 45°, outcropping on the east slope of Mount Davidson, having varied from a small vein to 100 and 140 ft., and even 200 ft. wide in some places. The stratum is porphyritic rock, and at times of a peculiar character, having large crystals of felspar and hornblendic prisms in its composition.

Opinions coming from a working miner may not be looked on as of much value, but although not old, it has been my lot to pass through several gold and silver excitements similar to the present. I was at the Eberhardt when that supposed magnificent property was disposed of to an English company; also at Mineral Hill, when the Messrs. Taylor and Sons purchased that mountain of silver [?] (and felt sorry I could not slip a note in the hand of the Englishman when conducted round by Messrs. Lent and Attwood, but such an action might be dangerous if detected by a certain class). These are things of the past, and what now most concerns us is the silver question—Is the world to be glutted and the grand old metal to become valueless? This will bring us again, Mr. Editor, to the Virginia Consolidated, and although not certain of the exact depth or size of the bonanza, I boldly say, do not fear. It certainly has a grand run, but will have its limits. Already down (say) 1700 ft., ground extremely easy, friable quartz, yielding easily to the pick; added to this, the lower parts of the mine almost insupportably hot, men drawn up daily during the summer season and carried to the bath (mostly called dead) house more like corpses than living beings. In fact, on my return to England, I had to consult a medical man, who said "Where have you been?" I replied "To Nevada." He said, in a most scornful tone, "I suppose you have come from Virginia City—V-i-r-g-i-n-i-a C-i-t-y. Say you have been to a dead-house," &c., in which I truly felt he was right, and such, Mr. Editor, is the source of the present great supply of silver. But unless the bottom of the Gould and Curry shows some signs of its continuance, since the dip is almost invariably southerly, as shown by the arrows in the sketch, you may venture to tell the capitalists and owners of silver not to despair—the Consolidated Virginia will not flood the world, or last for ever. Indeed, it will not at all surprise me ere long to hear of the concern being offered to John Bull, especially since there was a whisper not long since that some of the pioneer points, most likely the bottom, were not exactly up to the mark; in which case the Emma and similar antics may be played, as it is a well known fact that John Bull is, as a rule, more generous than wise in purchasing gold and silver mines on the Pacific Coast. But I do hope we are getting to know the expert Jonathan better than we did ten years ago, and to my certain knowledge most of the poor fellows on the Pacific Slope who have to toil in such a heated atmosphere—unfitted for human beings—have far too little of the metal in question at their disposal. A Cornish Miner.

*Drontheim, Norway, Nov.* 24.

[The sketch referred to can be inspected at our office by parties interested in the several mining properties.]

## MINING IN NEW SOUTH WALES.

Sir,—Our large and steadily-increasing growth of first-class wools for years past has tended to overshadow in the eyes of the commercial world our other natural riches, in the shape of timber and minerals, although the first is undoubtedly the strongest and most durable known, and the second abound in a profusion and variety which only want the aid of skill and capital to probably eclipse in value all the other productions of the colony added together. Take, for instance, coal and iron, those joint parents of manufactures and commerce. From comparatively hasty and imperfect surveys we know we have over 15,000 square miles of the measures in which they abound, our coal running north and south on the coast line for over 200 miles, unbroken as far as we know, and in some places for 70 miles due west inland, our chief port (Sydney) being situated about the centre of the basin (or basins, probably); and our iron deposits, mostly large in extent, good in quality, and varied in kind, outcropping in different places, but most notably at Wallerawang in the west, Berrima (Fitzroy Works) on the west-south-west, Bogolong on the south-west, Illawana and George's river south, Port Stephen's north, and Murrurundi north-west, places mostly over 50 and some 100 miles from each other; and as iron ore has never been sunk for specially, but only noticed when it forced itself to sight, the probability is that it also covers large areas of unknown extent. As to its quality, that is known to be over the average. At Bogolong the 15-ft. vein or seam, which has only been sunk on a few feet, from three separate assays, gave an average of over 65 per cent.; the Murrurundi veins also assayed nearly as high; and Wallerawang is said to be quite equal, and Fitzroy also, but as in no case, except Fitzroy, has anything more been done than just to raise a few tons of ore, and smelt a ton or two at most, no real estimate can be formed of either their quality or quantity, although practised miners from the Old Country, judging from surface indications and samples tried, pronounce the deposits certain to be large and permanent, and of high percentage, consisting as they do of hematite, black and clay band, magnetic, specular, and other ores. The variety will ensure easy smelting and a choice of kinds whenever work is carried out in earnest, and if the eager demand for the few hundred tons just sent to Sydney for the first time from Fitzroy Mines be an earnest for the future, there is no fear of the quality not being up to the standard, nor of our overstocking either our own or the Victorian market for some time.

The great obstacle to the development of our iron mines is having no ironmasters here who would bring their knowledge of the material and of the management of the mines to bear together to a profitable purpose, and our local capitalists have sense enough to know that they could not attempt the work with any real chance of success, as, of course, they would be entirely in the hands of their (imported) manager, of whose skill, knowledge, or even honesty they could not be sure, and therefore, however tempting the venture looks, especially now, with the Government bonus of 10,000*l*. for the first 1000 tons of iron rails produced here, they prefer to go on investing in stock, stations, or ships, or other things which they do understand, and over which they can exercise the control of certain knowledge and experience,

Copper ore also outcrops over hundreds of miles of country; and now that the railway is piercing the very heart of the district it is found in, and which joins direct on to the coal measures, many estates, whose 5 or 10 per cent. ores would not pay for smelting with wood, will be profitably worked by sending the ores to the Eskbank smelting furnaces, which use up the small coal from the collieries about 90 miles inland from Sydney, also the cheapening of carriage generally, will leave a margin of profit now sufficient to keep mines going which had to suspend work—such, for example, as the Goodrich, the carriage of stores to and copper from which was over 8*l*. per ton each way, but will now soon be reduced to 5*l*., or even less, although it is the farthest inland mine at present working whose produce is shipped *via* Sydney. There is, perhaps, scarcely an instance more pointed than the history of this mine to show how utterly ignorant Sydney men were of how to deal with a mine too far off then (it is six years since it first started) for any shareholder to visit, or for directors to see personally how the money went.

When first worked it was by a party of needy miners, who found a gold-bearing reef 60 ft. wide at surface, giving an average of ¼ oz. per ton, and who hired a small crushing plant, picked over the stone, and after making a few hundreds out of it, and not having funds to put up a powerful battery, cut races, built tramway, &c., sold out to a party in Sydney for 3000*l*. The purchasers felt sure they had a second Clunes, and before raising 1000 tons of stone first to prove the depth and quality of the stone, as any prudent man would, set to work and put up a 20-head battery, built a tramway one mile long to it from the mine, dammed up the river, built huts, &c., and in short spent 8000*l*., only to find that the yield dwindled down to 2 or 3 dwts. of gold per ton, which did not cover expenses; and after 12 months of this sort of work were finally astonished to learn from a commercial traveller who was accidentally up there that their manager was crushing copper ore. On enquiry it turned out to be true, and, of course, the bulk of the gold was in the pyrites. Furnaces, &c., were then built, and a 60-ft. shaft sunk, showing an average body of poorish ore of about 5 per cent., with belts and bunches of richer ores from 10 up to 40 per cent. The deposit, over 60 ft. wide, was, in fact, a huge quarry, and ore being boundless and timber plentiful, smelting began in earnest, the poor ores being crushed and the tailings concentrated for copper, giving about 20 tons per week of 12 or 14 per cent. ore, whilst the free gold paid all expense of crushing, &c. Some of the smelted copper assayed as much as 11 ozs. of gold per ton, and most of it over 3 ozs., whilst the whole immense body of ores showed over ½ oz., but, of course, in pyrites, so that the battery only got 1 dwt. or so of the free gold. The shaft was sunk to a depth of 80 ft. in all, but a poorer belt of ore coming in lowered the yield for two or three months. The shareholders got disgusted; the mining collapse took place here, and they actually sold the whole property for 2000*l*., though if there be any truth in the wet extraction process its value was nearer 100,000*l*., for the ore seems inexhaustible, and is so cheaply worked, and containing as it does both gold and silver, besides the copper, is the very kind of ore best suited for such a treatment. No sooner was it sold than the new owner (one of the original shareholders) found out that he could get nearly as much work done under his personal management by 38 men and boys as the company paid 74 men and boys to do; and he is, therefore, now making it pay even under the ordinary process, and having to smelt with wood, thus showing that the management is the principal thing after all. Although the Goodrich never had justice done to it by the company, still it had far better treatment than 99 out of 100 other failures had in New South Wales, and there is no doubt that at least 3 out of 4 of the abandoned copper properties would pay well if only started with a fair capital and honest management; and now that railways have suddenly opened up the country regularly visited by one or other of the directors.

One reason, and the principal one—why mining has never succeeded with us as it does in Victoria, California, Chili, &c., is the way in which companies have been formed to work (?) any newly-formed mine. First of all the owner of the ground asked and got an exorbitant amount, then the promoters took their bonus till, out of a probable subscribed capital of 20,000*l*., there was about one-tenth left to develope the property. Then a manager advises the board (the directors on which probably never saw a mine, and would not know one if they did) to erect machinery, &c.; this swamps all the balance, and runs into a thousand or so more. The board (sanguine enthusiasts) became security to the bank awaiting the first crushing or smelting, as the case may be, and if at the very outset that is not first-class, the shareholders refuse to pay calls, the bank sells the whole affair for 200*l*. or 300*l*., and there it lies for years neglected. This is actually the history of at least nine-tenths of our failures, whereas had the purchasers at first insisted on the mine being bought for paid up shares only (and every honest owner of an undeveloped mine ought to be glad to get paid in that way), and then, before spending one penny in machinery or furnaces, subscribed 2000*l*. or so to raise at least 1000 tons of ore, they would then have known for certain whether it was worth while going further or not. At any rate, their loss would have been reasonable if they decided to stop work, and if also they found it looked sufficiently good to be worth going fully into, then such a capital should have been put down as would have given the whole affair a full and fair trial, so as not to be entirely dependent on every week's work, as has generally been the case here, even with mines which have been kept manfully on by just a few friends working together in hope of being fortunate.

[*To be continued.*]

## EXCHEQUER GOLD AND SILVER MINING COMPANY.

Sir,—I find that I was in error in stating in one of my letters on the subject of the late special meeting of shareholders of the Exchequer Gold and Silver Mining Company that Mr. Syme had prompted Mr. Parrick's question about my telegram. Mr. Syme seems also to attach importance to my speaking of him as managing director, whereas he has never been formally appointed to that office as I well knew. I am also informed that I was mistaken in supposing that Mr. Smith *intentionally* or *consciously* interrupted me. I regret my mistakes in the first and last case, and any offence I may have unintentionally given to Mr. Syme, or anyone else.

*Junior United Service Club, Dec.* 6. A. Joy.

## FOREIGN AND HOME MINING.

Sir,—For some years past considerable attention has been paid by British capitalists to mining abroad, and in many instances with marked success; while, on the other hand, some ugly failures have taken place, which, however, may be traced in a great degree to mismanagement. Yet, as a rule, foreign has the advantage of home mining in one very important respect. The better remuneration of foreign going men has induced most of the very best mine agents of Great Britain to accept situations abroad. This great advantage has resulted in the discovery and subsequent working of rich lead, copper, tin, iron, manganese, and other minerals, and has so glutted the metal markets as to send to the wall many mines in Cornwall, Ireland, and other parts of the kingdom, which, under different circumstances, would now as of old be worked to advantage. If home mining would thrive and compete successfully with foreign mining, good men must be encouraged to stay at home.

My vocation has necessitated my travelling a good deal in America, Spain, Italy, and other mining countries, and I have met in these parts English mine agents of the highest order doing the work of two, and often three, of the ordinary mine captains at home. One mine agent who knows his business as manager is capable under ordinary circumstances of conducting the whole of the operations in any metalliferous mine employing under 200 men; instead of this we often find—the underground agent, the surface agent, the manager, &c., all very useful, of course, where much work is to be done, but far too heavy a drag on the very limited resources of small and struggling concerns, where one good man, properly educated in mining, could do the work of the three above-named officers. The order of mine agents that are required for opening up and establishing successful mining both at home and abroad are men that have been bred to practical mining from their youth, and are well up in the knowledge of mining business generally, which principally embraces tribute, tutwork, dressing, mechanics—as applied to underground and surface operations—assaying, and dialling, also a fair knowledge of mineralogy and geology.

It may be advanced that all these qualifications are seldom possessed by one individual, but of late years men of this class are increasing in number, and are most valuable to the mining companies who are so fortunate as to secure their services either at home or abroad. Foreign mining is seldom entered into by British capitalists but where the prospects of success are very good, and the failures that have taken place from time to time are mainly due to the mistake of employing a host of officers instead of one or two good men of the right class.—*Portugal, Dec.* 1. Traveller.

## COAL WORKING—"BILLY FAIRPLAY."

Sir,—You may perhaps have noticed that a movement is being made in the Northumberland collieries for the introduction of "Billy Fairplay;" and as "Billy" is as much needed in Lanarkshire as there, I enclose you a sketch of him, and I am sure you would do much service to your mining readers by inserting it in your paper. In the Lanarkshire collieries the miner at the "face" fills round coal and dross together into one tub. The tub is then drawn from the face by men, or horses, or machinery to the shaft, and up the shaft. On reaching the surface it is emptied over a screen, the bars of which are 1 in. apart, the dross falls through between the bars and drops into a wagon, the round coal passes over the bars into another wagon. In this way the coals are separated into the two kinds, "coals" and "dross." At the present time coals can be purchased at the pit for 5s. per ton and dross for 6d. per ton. As a rule, there are 33 tons of dross for every 66 tons of round coal. But the quantity of dross depends upon two things—(1) The hardness or softness of the coal, or the "holing," and (2) the care and ability of the miner in preparing and breaking up the coal at the face. The first point is a matter for the manager to remedy, by working the coal on the most judicious system—either by long wall or stoop-and-room, or by holing in other material than the coal; the second is entirely in the hands of the miner. Now, as the miner is paid so much per ton of the mineral in the hutch, whether coals or dross, his only lookout is to work the coal in the mode easiest for himself, regardless whether it be coals or dross, and so, in a stoop-and-room working, instead of holing under the mass of coal to be brought down for 3 ft., shearing or cutting in the sides to separate it from the solid coal and then forcing it from the roof with wedges, he very frequently merely holes under the mass, and puts in one or more charges of gunpowder to burst it out from the sides. This lattter mode, as you will see, saves the time of the collier shearing; but against this he has the trouble of boring the holes and the cost of the gunpowder. I expect it will be found, however, that upon the whole the collier prefers to use gunpowder. But the result of the use of powder is that the dross is increased from 20 per cent. to 30 or 40—say, 33 per cent.; and instead of having 80 tons at 5s. and 20 at 6d., equal to 20*l*. 10s., the coalmaster has only 66⅔ tons at 5s. and 33⅓ tons of dross at 6d., equal to 17*l*. 10s. You will easily see, therefore, that it is of the greatest importance to the coalowner to have men about him who will produce the largest proportion of round coal. Incidentally, I may also remark that the price per ton paid to the miner for hewing the coal, is only about one-third to one-fourth of the cost of producing the coal.

Having said thus much, you will readily see that it would pay the owner to give a higher rate per ton to the miner for the coals in his hutch than for the dross, if there were some convenient and simpler mode of ascertaining how much of each was in each tub or hutch. This is done in South Wales by the machine called "Billy Fairplay," a sketch of which I now send you. The loaded tub, on reaching the surface, is weighed on an ordinary steel-yard, and the weight noted, it is then passed to a screen and emptied, the coals run over the screen-bars into a wagon, the dross falls through the bars into a box called the "Billy-box," to which a spring steel-yard is attached, so that the weigher can see the weight of dross it contains, and this quantity deducted from the gross weight shows the quantity of coals contained in the hutch. Whenever this is ascertained, he draws a

cord which opens a door in the bottom of the "Billy-box," and allows the dross to fall into the wagon. The door is then shut and ready for another tub. In this way 400 or 500 tons of coal a-day may be passed over one screen and the contents of coal and dross exactly ascertained. If such a machine as this were adopted in Lanarkshire, and the miners paid a premium on the proportion of coals he puts out, it could not fail to be a great benefit to all parties.

AN ENGINEER.

## IRON ORE.

SIR,—In reply to the enquiry of your correspondent "T. B.," in last week's Journal, headed as above, I have had many years and considerable experience in the iron ore trade and iron ore contracts and sales. Where a dispute arises between buyer and seller as to quality under a written contract, the nature, terms, and conditions and evidence thereunto attached would speak for themselves, and, of course, no custom exists in the face of a written contract. When the contract is a verbal one consummated and made valid through a past performance, and no guarantee of contents of metallic iron made at the time of sale, the buyer is bound to pay the agreed price if the bulk of the ore represents fairly the quality that was sold and is of fair merchantable quality in other respects. By fairly I mean a certain percentage above or below what was represented at the time of sale, which percentage margin (of metallic iron) is again regulated according to whether hematite, oolitic, magnetic, clay-band, spathic, &c., or any other description or nature of ore. If it is below that fair percentage of margin the seller would not be entitled to the full price, but to a price per unit *pro rata*, provided it is not below a certain standard percentage, according to the class of ore sold, in which case the buyer would have a right to refuse acceptance of the ore altogether. Of course, should the buyer have used it, or any part of it, he must pay the full purchase price.

Assuming that a certain percentage is guaranteed, but no allowance provided for, up or down, in the contract or sale, a *pro rata* allowance of the price of the ore per unit would be considered a fair equivalent for deficient quality, and would be the customary way of selling it. For instance, if 50 per cent. metallic iron were guaranteed, and it produces on fair sampling (which is the most difficult thing to arrive at) only 48 per cent., and assuming the contract price was 20s. 10d., the seller would have to allow 5d. per unit, or (say) 10d. off, and receive only 20s., whilst should the sampling turn out 52 per cent. metallic iron the seller would be entitled to receive 10d. per ton more as compensation for extra quality. The buyer, according to custom, would not have the power to refuse to receive or pay for the ore simply because it was not up to the exact standard guaranteed.—*London, Dec.* 4. A. B.

## LEAD MINING IN THE ISLE OF MAN.

SIR,—I often think that, valuable as has been the service performed by Mr. Murchison by the publication of his excellent book on the lead mines of the United Kingdom, his work would have been more complete, and have formed a reference book of great value to the investing public, had he extended his research and comments to the young mines, and not confined himself so exclusively to the historical and wealthy mines. It may be said that in the weekly or monthly reports furnished to the Journal by the managers of young mines the public are supplied with all the data from which to judge of their value. This may be true to a certain extent, but what is required is the opinion of an experienced and independent man—a man in whom, in the first place, the public have confidence, and who, in the second place, is totally unconnected with the proprietors or managers. Such a position Mr. Murchison holds, and I yet hope to see him devote some attention to this branch of the lead mining interest. Mr. Murchison argues, and I think fairly, that lead mining in the United Kingdom is comparatively in its infancy only; that there yet remains a vast field of enterprise in this direction in which capital may be wisely and lucratively employed. If this be true of England, Scotland, and Wales, it is unquestionably true of the Isle of Man, which has scarcely received that attention from mining men it deserves. It is often said that the Island can boast of only two paying mines out of 22 mining ventures; but it must be borne in mind that some of the 20 unremunerative ventures were notorious "jobs," got up by a set of "underminers," who care little as to the means by which they can delude the public so long as they can induce people to take up shares in their rotten concerns. I could mention more than one of these; and one in particular I remember came out with a great flourish of trumpets, lead being, it was said, discovered in abundance, and it was not until the poor shareholders' money was done the fact oozed out that the large discoveries of ore had been taken to the "mine" in a wheelbarrow, and the supposed lode carefully and judiciously "salted." A few tricks such as this gave the Isle of Man a bad name, and frightened capital away, and for a long time new ventures in mining have been looked upon with suspicion. Some of the young mines are, however, I am glad to say, in a fair way of turning out well, and I should not be surprised to see, in the course of the next year or so, a great deal more attention being directed to the development of the mineral resources of this little country.

I visited one of the young mines here on Saturday, Nov. 18; and, as it is not quoted in the share market, and the shareholders are not in want of capital, I shall not be open to the charge—especially as I am not a shareholder—of having a sinister motive in bringing the position and prospects of this concern under your notice.

I had, I must confess, imbibed a prejudice, and I hardly know from whence, against the Central Foxdale Mine. My astonishment was, therefore, extreme when I found, on visiting it, so much evidence of prosperity. I was very kindly received by Mr. Edward Bawden, the manager, and son of Mr. Bawden, the late manager of Foxdale Mines. Central Foxdale is situate about 1½ mile to the eastward of Foxdale Mines, and is being worked on the Foxdale main lode, having besides three or four counter lodes. There are three shafts—the main, or engine-shaft, which is sunk to a depth of 105 fms.; the Taylor shaft, sunk to a depth of 50 fms.; and the Amy shaft, sunk 40 fms. There are two splendidly kept engines, horizontal, of 40-horse power each. They draw and pump for the engine and Taylor shafts, and pump for the Amy shaft, the drawing for the latter being done by a horse-whim. The cross-cut levels in the Taylor and Amy shafts have proved the lode to be making true eastward, with a nice increase in width and quality as depth is attained; but it is in the engine-shaft workings that the large and valuable discoveries have been made, and to these I shall more particularly refer.

As soon as I mentioned the object of my visit I was at once invited to go underground, being handed over for that purpose to the guidance of Mr. Buzzo, the "overman," or underground foreman, and found him a very attentive and intelligent Cornishman, and evidently a thorough miner. The descent of the shaft is by means of ladders, and thanks to the excellence of these, which are admirably fixed, and in excellent order (indeed I may here add that I never saw a better shaft as regards formation, clean walls, careful timbering, and arrangement of pumps) we reached the 105 fm. level, or bottom of the shaft, in about a quarter of an hour, and with little fatigue. After a brief rest we commenced an exploration of the various levels. The cross-cut from the bottom of the engine-shaft towards the lode has progressed about 8 fms., the forebreast having every appearance of being in the immediate vicinity of the lode, and the manager and overman both informed me that they expect to cut into it any day. From the way in which the lode has opened out in the higher levels a width of ore of quite 8 ft. may be looked for. On ascending to the 90 fm. level I found the ore in the end from 5 to 6 ft. in width, and in the 75 fm. level it was from 3 to 4 ft. wide. In the 60 fm. level the ore is about the same width as in the 70 fm. level, but less solid. I need not refer more particularly to the 45 and 30 fm. levels than to say that the lode in these will, when the time arrives for its being driven upon, produce a considerable amount of lead ore. But it is in the deeper levels that the mine gives an earnest of great future productiveness. The end in the 90 fm. level is valued roughly as worth from 60*l.* to 70*l.* per fathom. From the appearance of the ground, and the steady improvement in the lode as depth is attained, I feel confident the 105 fm. level will turn out far better than this. If this should prove to be the case then the work of opening out the reserves will be commenced, and the lode driven upon it in all directions from the different levels. In driving the various cross-cut levels to prove the lode the company have been obtaining from 20 to 30 tons of dressed lead per quarter, which sells at an average of 15*l.* per ton. They have not touched the discoveries in the lode, however, except in driving through.

The washing-floors are roomy and well made, and will require but a small expenditure to fit them for the reception of more elaborate dressing machinery, which I believe will soon be absolutely necessary. The engine-room is admirably kept, and the machinery—engines, pumping, and winding-gear, &c.—in splendid condition. The smiths' shop, coal yards, manager's and foreman's offices, &c., are well built, and liberally found. The only drawback I saw in respect of surface arrangements was in the miners' room, which is hardly in keeping with the general excellence of the company's property.

As soon as the lode in the 105 fm. level in the engine-shaft is proved communication is to be opened out, I understand, between that shaft and Taylor's and Amy's shafts for ventilation purposes, and for facilitating underground work.

I think I have said sufficient to show that there is at least one young mine in the Isle of Man which is being worked with every prospect of early success, and I only hope that this instance, along with others that I may hereafter draw attention to, may induce Mr. Murchison to add to the valuable information his book contains by extending his observations to the young mines of the kingdom.

*Dec.* 2. A BELIEVER IN HOME LEAD MINING.

## GLENROY MINE, ISLE OF MAN.

SIR,—As some of your correspondents have thought proper to allude to this undertaking for two or three weeks past, perhaps it would not be out of place, or uninteresting to some of your readers, to have the testimony of one who has been on and in the mine. Although my visit was what might be termed premature (being in August last, while the lower levels were under water), yet I saw sufficient, both at surface and underground, to satisfy myself that there was some solidity in the statements made concerning the futurity of this mine. Subsequent workings have done much towards verifying these assertions, and I firmly believe that future development will at no very late period completely verify these prognostications in well ascertained facts. For myself I have not a doubt about its early success. As I went over the surface and viewed its position in its various aspects, its contiguity to Great Laxey Mine, and its ready means of transit to the shore, I felt certain that if the underground portion of the property was even half so satisfactory as the surface we had much cause to congratulate ourselves on its possession.

At the top of the shaft the captain pointed out several fine specimens of ore, which had been brought out of the 40 fm. level. One piece I endeavoured to lift, but found it too much, although it would not be more than 10 in. square; I should judge it weighed considerably over 1 cwt. It seemed to me nearly solid lead, mixed with blende and a little copper.

On going underground we got down to the 40 fm. level, but in consequence of the water we could not get lower. I examined the lode at the various cross-cuts, and found it all that it had been represented—rich in quality, and apparently (as they had not cut through the lode) unlimited in quantity. Of course, it is slow work driving shafts and levels in native rock, and sometimes we are apt to lose patience in waiting for the gradual development of the various lodes which are known to exist, but which are so slowly arrived at; but with Glenroy I believe our patience will not require any great degree of elasticity before we have a thoroughly satisfactory termination to our waiting in the shape of gradually increasing dividends.—*Manchester, Dec.* 6. C. AINSWORTH.

## THE PNEUMATIC STAMPS.

SIR,—I think Captain Harris deserves the thanks of the mining public for his able letter in last week's Journal. It is but seldom that any exact and reliable information can be obtained from the "practical" Cornishman, especially if he happens to occupy a leading position. Loose generalities and round assertions as much as you please, whether it relates to the value of a lode or to the performance of a rock drill. Capt. Harris has, however, kindly given some figures, but his information is scarcely complete. Will he state, through the Journal, the general size of the stuff introduced into the "kover" at Great Wheal Vor, the diameter and weight of the stamp-head, the fall of the head, the number of blows made per minute, the dimensions of the grates, the diameter of the hole in the grate, and if the smaller or larger heads are to be preferred for reducing tinstuff, also the proportion of the 400 tons stamped by the single head during the month to which he refers? The concluding remarks in Capt. Harris's letter are much to the point. We want cheaper and better dressing appliances, and a radical change in the laying out and conduct of our Cornish mines. More true engineering ability, less share dealing, less charlatanism and more knowledge, *larger* remuneration to mine agents from the adventurers, and *less* remuneration to agents from merchants. In fact, it is highly desirable to cleanse the mining Augean stable of its foul and loathsome mass of corruption, so that honest men may live and obtain a chance of doing their lives' work righteously and with every advantage to the generation around them. K.

## FREE TRADE, AND COPPER.

SIR,—In this epoch of the world's history all things are mutable both on land and at sea. Russia is no less arrogant in her pretensions than she is exacting in her tariffs. Commerce and politics are alike out of joint, and it is far in prospective to foreshadow the date when the wheels of trade and manufacture will become greased through the blessings of peace and the honest progress of native industry and thrift in that country. Russia, comprising an area of about 350,000 geographical square miles, and some 80,000,000 inhabitants, is peopled at an average of (say) 230 per mile, while England, with 5500 geographical square miles, has a population of 30,000,000, equal to 5454 to each mile, Hence the application of free trade, through the extinction of export and import duties, differ materially in the two countries.

The removal of import duties on copper have greatly augmented our trading in the article, and the staple manufacture and appliances of the metal are extended in various and ramified ways, totally at variance with a limited supply. Hence manufacture, trade, and commerce, extending and permeating every circle of our industries, are advanced through free trade in copper. The cyclone which devastated the shores of India recently destroyed at one gulp more people than the copper mines of Cornwall and Devon number fivefold, and though all right thinking men regret the decay of this industry in the Far West, yet all must admit that the community at large is benefited through the cheap prices at which the metal can be imported and utilised in manufacture and other home industries, for it is evident that the production of England is unequal to the demand. Hence we must attract our colonists and the foreigner to our markets in favour of free trade.

The production of copper ores for the year 1875 of the United Kingdom was 71,528 tons, yielding 4322 tons of metal. The fluctuation in market prices during the year ranged from 93*l.* 10s. to 87*l.* 5s., averaging 90*l.* a ton throughout the period. The present quotation is 84*l.*, 85*l.*, or 5*l.* 10s. per ton under the average of 1875. The commercial value of the whole product to the miner is stated to be 333,414*l.*, or just 77 1-7th*l.* a ton, and 12 6-7th*l.* below the average market worth, embracing costs of carriage, smelting, brokerage, and smelters' gains. The amount of copper ores and regulus imported during 1875 was 566,503 tons, containing 29,483 tons of metal. Thus it will be seen that the United Kingdom contributed only about 12¾ per cent. of the quantity brought to market, Cornwall and Devon finding over 85¼ per cent. towards it. The aggregate number of our home mines is 100, of which the following have declared dividends during the year 1876:—Alderley Edge, Glasgow Caradon, Marke Valley, South Caradon, and West Tolgus, with East Pool and Gunnislake, which also produced tin. The average quantities of ores to produce 1 ton of metal were for the year 1875—Cornwall, 14⅛ tons; Devonshire, 14; Cheshire, 98; Cumberland, 14 1-5th; and Lancashire, 12½ tons. Five counties in Wales show 5, 9, 1, and 4 tons of metal respectively, with Anglesea, 4612 tons of ore, to yield 126 tons of metal, is close on 2½ per cent.; Ireland, from 3125 tons of ore, gave 255 tons of metal, equal to 8 16-100th per cent. From these figures it becomes evident that the trade and manufacture of the country depend upon our colonies and foreigners for supply, while our home productions gradually diminish, and the profits to mining enterprise lessen.

We shall next week refer to the tin productions, and the state of mining for that metal. R. TREDINNICK,

*Dec.* 5. Consulting Mining Engineer.

## THE PRESENT OPPORTUNITIES FOR INVESTORS IN MINING PROPERTIES.

SIR,—In my last letter, which you were so courteous as to insert in your columns, I called the attention of the investing public to some points of interest in the present position and prospects of mining properties. Permit me to resume that subject. It has been said by many for some time past that the tin mines of Cornwall are virtually exhausted, or nearly so; that this country will be overstocked with foreign and colonial tin from the straits of the great Eastern Archipelago, Queensland, and New South Wales; and even Mexico has been named as a successful rival to Cornwall. It appears to me that these apprehensions have been created by the late long-continued depression in prices, which resulted from the general dulness of trade here and everywhere among our customers, excepting only France and Australia; and that, after all, the present is a propitious period for the purchase of shares, as the indications of reviving commerce are so distinct and decided as to make it certain that prices will rise to a level which will lead to the working of many Cornish mines now silent, and to renewed energy on the part of individuals and companies until just now disheartened. In recent issues of the Journal it was shown that a considerable number of Cornish tin mines are making good returns, even at present rates, and that the value of shares is looking up.

It appears from the Government records last issued that 183 fully developed tin mines sent ore to the market during 1875, which circumstance does not support the lugubrious statement of mines bearing this metal having been all closed from the state of the markets; and that the value of the metal amounted to not far short of 1,000,000*l.* The quantity of ore produced was only 44 tons less than in the year 1874, a better year of general trade. Were it not for the peculiar condition of affairs in the United States and in Russia, where the import of tin declined in a remarkable manner, the product of English mines would have exceeded 1874, and it is now obviously exceeding that of 1875. Moreover, it is to be noted that after all the expense of our foreign competitors in bringing their products here they never fetched the price of Cornish tin in this market nor in any other. The quality of the latter is superior, and is required to aid in the manufacture of that which is imported. Banca tin comes nearest in market value to Cornish, but Straits and Australian have never yet approached it.

During 1875 the fluctuations were very great, the lowest 81*l.* 10s., and the highest 102*l.* 10s. for English blocks. This year, also, prices have varied considerably, tending to a dead level the early part of the year, but now tending upwards, and fairly coping with last year's rates at this season, when the Baltic is frozen and the Russian demand is over until spring unlocks the ice gates of the Neva. If peace be preserved our metal trades will keep pace with the general trade. Russia will hardly enter upon a winter campaign, and if, nevertheless, she be bent on war, she will probably receive our tin by way of Odessa and through Germany at higher rates. If war ensues, whatever be the consequence to other departments of business, the values of metals will rise. Metal merchants and miners prefer peace, but will not lose by war. Any capitalist who peruses your columns can easily ascertain that good tin mines still pay, and are likely speedily to become once more a favourite investment. Of course, the wisest thing for investors is to purchase in progressive mines. There are rich tin mines only in progress, and rich ore ground yet to be opened up. The New St. Agnes, which I once before brought under your notice, claims attention. The reports made of its development are not merely encouraging, but place its ultimate triumphant success as a certainty. I shall be happy to furnish all particulars concerning this most desirable investment.

Lead mines are, however, now in vogue, and offer peculiarly favourable opportunities to capitalists. The market value for their produce is so steady, the comparative inexpensiveness of their working, the certainty of immediate returns, the mineral and metallic products, especially silver, accompanying the yield of lead are all circumstances which gain, and ought to gain, for lead mines a great popularity. The sale of this metal is never deteriorated by war, but always augmented. The production of it is very inadequate to our wants, and speaks urgently to "moneyed men" and "mining men" to bestir themselves, and bring out the vast treasures which the United Kingdom is known to possess, more especially as the market is such an even one, with a quiet, steady, upward tendency. For the last two years the average price of pig-lead has been about 22*l.* 10s. per ton, not more than 1*l.* 3s. per ton below the highest price reached, and, of course, the same above the lowest to which it descended.

It is to be regretted that while we have stores of lead in nine counties in England, ten counties of Wales, Scotland, the Isle of Man, and Ireland, the production has been actually falling off during the last two years. In 1874 the lead produced was 58,777 tons. In 1875 about 5000 tons less, and this year it has been in the same proportion less than last In 1874 there was found with the lead 509,277 ozs. of silver; in 1875 nearly 20,000 ozs. less. This indicates that more enterprise and capital must be brought to bear upon this most profitable industry.

The number of dividend-paying lead mines has been very great, and some of them have a well deserved notoriety. The Great Laxey, Van, Tankerville, Roman Gravels, West Chiverton, Minera, Foxdale, &c., illustrate these remarks.

It is, however, to prospective lead mines the investor must mainly look for profits, as shares can be obtained cheap, and profits will be at last magnificent. In the county of Devon there is the Combmartin Mine, which ought to command attention. The old mine was worked in the reigns of Edward I., Edward III., Henry V., and Queen Elizabeth, but the "old men" worked unskilfully, and there is still much ore. In 1835 the mine was again wrought, and upwards of 60,000*l.* worth of lead was raised. The object of the present company is, by the use of modern appliances and adequate mechanical instrumentality, to work out the ore which previous adventurers did not know how to obtain. There is in addition to the old mine a great extent of undeveloped mineral ground, which the company purposes to work with vigour proportioned to the great value of the deposits. There are five rich lodes which traverse the sett. The position of the "country" is all that could be desired for transport and export. Capt. Wm. Trelease, Capt. Robert Robins, Capt. Richard Morcom, and the directors and purser of the old Combmartin Company, bear distinct and determinate evidence as to the wealth of the mine and the possibility of working it.

Mr. Wm. Newton, for 10 years dialler and mapper to the late company, says—"I have assayed fahlerz ore upward of 1200 ozs. of silver per ton, the average ore being 62 ozs., which is unusually rich. I have seen a rock of ore weighed 10 tons 14 cwts., and would now sell for 28*l.* to 30*l.* per ton for silver-lead." The antecedence and future prospects of this splendid property, together with the low price of the shares—8s. per share—should act as an incentive to investors seeking legitimate mining enterprise.

There is a very fair opportunity for investment in coal mines. There is every prospect of the value of coal being steady for some time to come, for although many new pits have been opened up this year, and are vigorously worked, any revival in the iron trade will increase consumption; and our export trade is rapidly rising, especially to France, which is giving a decided preference to the mineral produced here over that yielded in Belgium. Among collieries there is not any better for investment than Chapel House,

situated in Lancashire, within a short distance of Liverpool and Fleetwood, with a large trade to Dublin, where, as in Liverpool, the company has wharves. The demand exceeds the output, and the investment is most profitable. The profits made are even now at the handsome rate of about 2s. per ton on the coal raised, and the output is now about 300 tons per day. Magnificent machinery, however, is in course of erection, and when completed the output may be increased to 1000 tons per day. At 2s. per ton this would yield a profit of nearly 30,000*l.* per annum. Thus, reviewing certain portions only of mining enterprise in this letter, I venture to think I have shown good reasons for prompt and liberal investment in mineral and metalliferous mines. GEORGE BUDGE.

4, *Royal Exchange Buildings, Dec.* 6.

## MINE AGENTS.

SIR,—What is it that tends to make mining such a risky speculation to adventurers? The answer may be found in a variety of causes, but chiefly, as I think, to the wretched salaries given to our mine agents. Imagine what is required of an agent or mine manager. He should know the piece of ground, the method of working ground, the timbering of ground, the proper and most economical method of furnishing a mine with ladders and ways, the fixing and maintenance of pumpwork, the management of boilers and machinery, the dressing of ores, how to survey and plot the underground workings, how to investigate the price and quality of materials, and have a knowledge of accounts. He must, or should be, partly a geologist, a mineralogist, a mechanic, a draughtsman, an accountant, a correspondent, and a director and leader of men. He must stand between the miners on the one hand and the adventurers on the other, dealing justly towards both, all of which he is expected to perform for a remuneration of some 40s. or 50s. per week. Is it any wonder that, to support a social position imposed on these men by the circumstances in which they are placed, that they frequently become gamblers in shares, accept commissions from merchants, look to these as their best friends, and breed with each other the vice of lying and corruption? The Messrs. Williams and Taylor no longer occupy the powerful position in Cornish mining that they did forty years ago, or they might see the instant justice of remunerating mine agents more liberally. A sum of 40s. a-week is now the wages of a common fitter of machinery, with no responsibility upon him other than to stand to his vice or lathe. It is *not* the remuneration for a mine agent of ability and integrity, and the sooner that this is acknowledged and amended the better it will promote the interests of shareholders and the mining public generally. NEMO.

## WHEAL GRENVILLE.

SIR,—A great deal has been said by the present management about the large amount of debt left them as a legacy by the former management. Some time ago this debt was stated to have been 5000*l.*; at the last general meeting the Chairman is reported to have said that at the time the present company took office there was an adverse balance of 5580*l.*, and there were other debts and current expenses which increased the amount to 6000*l.* Anyone reading this, and unacquainted with the facts, would naturally conclude that when the present management assumed office they found debts which had been kept back from the knowledge of the shareholders to the extent of 6000*l.* At the last general meeting (Oct. 6, 1875), held during my secretaryship, the balance-sheet then presented, and afterwards printed and sent round to every shareholder, showed the amount of 4944*l.* 18s. 11d. due to merchants to Aug. 14, 1875. When I handed the books, &c., over to Mr. Laws in November a portion of this had been wiped off, and the amount then owing to merchants up to Oct 9, 1875, was 4063*l.* 0s. 8d. I, subsequently, asked Mr. Laws if he found this amount correct, and his answer was "Quite correct." I also asked him if he had found any bills outstanding up to Oct. 9, and which had not been charged, and his answer was "Not a farthing." In the first balance-sheet presented to the shareholders by the present management the amount of merchants' bills unpaid to Nov. 6, 1875, is given as 4439*l.* 16s. 10d.; royalty, 183*l.* 13s. 1d.: total of liabilities to that date, 4622*l.* 19s. 11d.; and there is also an estimate of the liabilities and assets to Jan. 29 of this year, and showing an estimated balance against the company to that date of 5166*l.* 1s. 8d., so how the Chairman can make out the debt he succeeded to as 5580*l.*, much less 6000*l.*, I am at a loss to conceive. In May last an old debt of 82*l.* cropped up, and of which I had no previous knowledge, but as the present committee dispute this, and the matter will have to be settled in Court, I shall make no comment upon it. Here I may remark that the amount of the company's liabilities was invariably charged in each quarterly balance-sheet, a printed copy of which was sent to every shareholder, and, therefore, the debt was well known. The present Chairman might have been ignorant of it, because he only became a shareholder in the company a few days before the change of management took place, but Mr. Lane and the other member of the present committee were well aware of the debt, because they attended general meetings, and knew that the reason the debt remained unpaid was simply because the shareholders were adverse to making calls to wipe it off.

With regard to the Chairman's remark that if the old management had been retained the present liability would not be 6000*l.* but 10,000*l.* or 12,000*l.*, the Chairman is, of course, at liberty to entertain such an opinion, but I think it would have been more prudent had he kept it to himself. Any mine agent will tell him that what has been done thus far by the present managers could have been done by the former, or any other managers, and by-and-bye the new managers may do that which the old managers may say they would not have done. Even if the mine had been 6000*l.* in debt when the management was changed the Chairman should remember that the present clear book has not been effected by profits from the mine, but that calls to the amount of more than 9000*l.* have been made upon the shareholders under the new management. Besides, I have a strong recollection that in March last the shareholders were told that the old agents had left thousands or tens of thousands of tinstuff standing in the mine, and if such were the case where is the merit of simply taking away ore discovered by other parties, and I think it displays but little energy on the part of the present management that even under these favourable circumstances they did not begin to materially increase their tin returns until about two months ago. Under the present management not a fathom has been sunk in the mine, and I cannot imagine upon what grounds the Chairman asserts that if the management had not been changed the debt of the company would at the present moment be 10,000*l.* or 12,000*l.* The Chairman points to the loss made in the last three months of the old management, but on his own admission this loss was incurred in opening tin ground, which the present parties are reaping the benefit off.

A short time ago the mine was inspected by a well-known agent, and his report is now before me. Among his remarks are the following:—"To attribute anything extraordinary to the present management is a farce, but I must say were I in Capt. Hodge's place I should do much the same thing as he is doing—keeping the stamps going with the best stuff, and I should also keep it well supplied. This is the only secret of present success. I question if the ground now being opened is nearly so good as that which is being stoped. I believe the maximum returns with present appliances are reached, and to put the mine in a good position not much less than 6000*l.* should be laid out in engines, pitwork, and other machinery." Upon this view as to the machinery I make no comment. Possibly your correspondent, "F. L. A. T. Rodda," who is evidently well acquainted with the mine, may have something to say upon the matter, but I cannot help observing that under the old management Mr. Lane was ever most anxious for an immediate and heavy outlay for additional pumping and stamping power, and it was my opposition to this that first raised his wrath against me. Now, when some of the shareholders, including the manager of the mine, are urging the erection of further machinery, the committee, of which Mr. Lane is a member, say they "would not be justified in recommending any large outlay on that head at present."

Now, after the inconsistencies I have pointed out, why cannot the committee leave the old agents alone? They have what they wished for—the entire control of the affairs of the company; they have their own appointed officials, they are satisfied that they have a valuable property, which they are managing as no one else could manage it, and they possess the entire confidence of their fellow-shareholders, yet with all this at each general meeting they must say something in disparagement of the former management. It would seem that beneath all their self-laudation and confidence there is a disguised something which stirs their spleen, and makes them vent it upon the very men who, according to their own account, have by the commission of much error and mismanagement assisted them towards future popularity and fortune. Whatever the faults of the old managers might have been, however great the debt that was allowed to accumulate under their management, I can tell the Chairman that during the years that I was connected with the company I never knew the mine to sink to so low a value in the share market as it has within the past six months. JOHN WATSON.

*London, Dec.* 5.

## DEVON GREAT CONSOLS MEETING.

SIR,—I read the account of the Devon Great Consols meeting in last week's Journal with much interest, and I wish to make one or two observations thereon. It appears to have been tacitly assumed that Mr. Field's position in the arsenic trade is analogous to that of the Devon Great Consols. This is, however, an entire mistake. The Devon Great Consols are the largest arsenic producers, whilst Mr. Field is not a producer at all, but only a refiner, having to buy his crude arsenic from various mines. Whilst, therefore, a high price for arsenic is wholly in favour of the Devon Great Consols, it is not to the advantage of Mr. Field, since the price of the raw material advances with the price of refined arsenic. In fact, Mr. Field's position may be said to be antagonistic to that of the Devon Great Consols. Let me further remark that it is satisfactory for the shareholders in the Devon Great Consols to have such disinterested testimony to the superior quality of their arsenic, when Mr. Field (the proprietor of the brand of the late Mr. Garland) is so anxious to buy it. ONE WHO KNOWS.

## DEVON CONSOLS, AND THE ARSENIC TRADE.

SIR,—By a process of reasoning I and many others cannot understand, that the directors of a public company should take a quiet bid of 6d. per ton over any tender, without allowing those who tendered to review their tenders, is "what no man can understand" who knows what business is. Let there be no sham about tendering. The parties who tendered for the parcel of arsenic were as well able to pay for the same as those who got it. What means, then, the Chairman when he says they do not bind themselves to accept the highest tender? When Mr. Field offers to give a higher price than the directors sell their arsenic for—nay, even sell it at 1*l.* per ton below what they can get—the directors, in common justice to the adventurers and lord of the mine, should pay the difference out of their own pockets. That the Cornish Arsenic Company would, by the monopoly of the trade, be enabled to raise the price from 17*l.* to 20*l.*, or even 25*l.* per ton is not surely a question for the directors of the Devon Great Consols, but as business men to get a higher price from Messrs. Drayton than from Mr. Field, or *vice versa*. It is not a question for the producer of arsenic to ask whether the buyer has a large or small stock, whether he has more than he wants or less, whether he intends to sell it at a high price or a low one, but the question is will he give a higher price, and can he pay for it? If the directors depart from this they go beyond their province, and do an injustice to the buyer, to the shareholders, and the lord.

If an exclusive monopoly tends to put up arsenic to an unusual price by the control of the market it will clearly be a very profitable business, and will bring other manufacturers into the market. The action of the directors in this instance has been to discourage competition, the life and soul of business. The arguments adduced are as contradictory as futile, and if persisted in cannot fail to involve the directors in litigation, and the displeasure of their proprietors. What necessity, what policy can there be in selling 12 months' stock in advance? Why cannot the produce be sold three-monthly by tender to the highest bidder?

Public companies have no right to withhold information from shareholders until a threat is used of an appeal to the Stannaries Court to obtain what has always been and is his or their right to obtain and know. The ventilation of this question at the meeting, let us hope, will sweep away an abuse which never ought to have existed, and lead to the sale of arsenic on business principles.

*Dec.* 4. ARSENIC.

## SOUTH CONDURROW MINING COMPANY.

SIR,—It was with considerable satisfaction I read in last Saturday's Journal the letter of a "Satisfied Shareholder" of South Condurrow Mine respecting the former and present management. At the time of the proposed change I voted for the late managers, presuming they were conducting the management for the best to the shareholders, but I was only a speculator in the shares (knowing no more about mining than the man in the moon), and, presuming the mine to be a good one, I have held on through good and evil report for years, and find now I have not been disappointed, as the mine has paid dividends while the price of tin has been at its very lowest. With a slight advance in tin dividends must considerably increase and the shares have a rise in proportion, though I am not so sanguine as the shareholder who anticipates they will 'go to 30*l.*' I see by the report of Nov. 28 that a considerable improvement is anticipated in sinking the Plantation shaft; if so we may expect a good rise in the shares.—*Belfast, Dec.* 4. AN IRISH SHAREHOLDER.

## NEW CONSOLS SILVER AND ARSENIC WORKS.

SIR,—Having through the kind permission of the manager, Capt. R. Pryor, been enabled to visit the above extensive works, and having previously heard and read much for and against them, I propose to trespass for a short space on your valuable Journal. The wet, or chemical, process which has been employed successfully for the last 32 years in Germany, is comparatively new to Cornwall, and, considering the attendant difficulties and the great outlay necessary for their erection, they deserve to, and will succeed.

The manager has had much to contend with, not only in the too evident unwillingness of Cornishmen to promote or adapt themselves to any new system which their forefathers knew not of, but also through the backwardness displayed by the provincial workpeople at the idea of working or even touching arsenic when undergoing calcination, and it was not until Capt. Pryor brought up new men from the West, who had not their fear, that they would with any show of willingness facilitate the carrying out of this plucky undertaking—plucky, not only with reference to the above, but also considering the average poor quality of their ore. They are now raising 45 to 50 tons daily, but will shortly increase the output to 65 or 70 tons, and possibly more. Hundreds of tons of ore can with ease be got away, thanks to the old workers, who mined principally for tin and copper, which was not saleable under 4 per cent., and latterly for tin only, leaving the copper in the lode standing.

By selection, which they have now happily adopted, and through the rejection of 25 per cent. of poor stuff, and the nearer concentration of their arsenical and argentiferous ores will save on the present small amount treated near 7000*l.* of their annual costs, and they will be able by these means to treat 70 tons of ore at a comparatively less cost than, as previously, 50 tons. And if treating 100 tons their dead dues will not exceed what they are now. The lowest point in the mine is 96 fms., with the lodes improving as they descend and drive west. Their pumping and drawing gear is in excellent condition, and the works throughout are as well laid out as the hilly nature of the ground will permit. Each separate establishment is connected by tramways, and wherever practicable the motive-power is derived as inexpensively as possible from water-wheels. A third Oxland's calciner is now erected and lined, and will be in operation in a few days. The latter, with the two now at work, will be driven by a 25-ft. water-wheel, the recent heavy rains having delayed its erection. They now see their way clearly to the extraction of the silver from the cupreous liquors, which will, I hope, at no very distant date, be followed by the smelting of the copper and silver, and thus retaining all profits in their own hands.

In conclusion, I would recommend the laying down of a self-graduating line of rails from Monk's Corner, about 1¼ mile distant, to the floors. The existing excessively steep road—up and down which their heavily laden wagons are constantly labouring, with all of their supplies and most of their products—unless properly macadamised, will never be kept in decent condition; secondly, that telegraphic communication be established between Callington and the works which would well repay the trifling outlay, and affording instantaneous communication between the directors in London and the manager, when absent at Redruth, with the local officers; and, lastly, the employment of a good resident cooper.

E. S. P.,
Student of the Imperial Academy of Mines, Clausthal Harz.

## TANKERVILLE MINING COMPANY.

SIR,—We have again received a half-yearly report and statement of accounts of this company, nominally to Oct. 26, that being the day to which the company is credited with revenue, whereas the expenditure is made up to August, or two months less. The same thing occurred in the last annual account (revenue to April, expenditure to February), and I should be glad to know whether this mode of balancing accounts is legal; and if so, what is the limit of difference between the dates to which revenue and expenditure may be calculated. If two months, why not three, four, or five months difference. Again, between the dates of the two balance sheets (April 22 and Oct. 26) is 27 weeks instead of 26. Is this legal? and if 27, why not 28 or any other number? Why, in fact, should the accounts be called yearly or half-yearly at all, when they are actually not so? If such irregularities are not legal, (as they certainly are not business like), what do we pay our auditors for, who year after year pass such accounts; and are not auditors who so neglect this duty liable to punishment? AN OLD SHAREHOLDER.

## WHITE CLIFF LEAD MINE, NEAR LLANRWST.

SIR,—Seeing so much said in the Journal about the Llanrwst Clementina, Willoughby, and other mines in the neighbourhood, and references made in glowing terms to the district generally, I wish to be informed why nothing is said of the doings and prospects of the above mine, which consists of two setts, one on each side of the Llanrwst Mine and adjoining it? It seems to me that the shares of this company should (to judge by the prices of shares in adjoining mines) now be worth a very considerable premium, for we have nearly 90 acres of the very best ground, proved by the Llanrwst and other mines, and the lead we are getting is not from any of the lodes proved by them, which are still untouched. I have lately been to the mine, and now hear that a second sale of lead (10 tons) has been made (to Mr. Eyton), and the captain expects to make regular monthly sales henceforth. The capital of the company is about 10,000*l.* allotted, as against, I am told, 60,000*l.* at the Llanrwst, which I believe to be an excellent undertaking. The directors lately offered for subscription 3000*l.* of shares at par, the money to be employed in putting down the very best machinery for drawing and dressing the lead. I am willing to take more shares, but cannot get a price. Perhaps if you will kindly insert this in the Journal some reply will be forthcoming.

*Dec.* 7. A SHAREHOLDER IN THE WHITE CLIFF LEAD MINE.

[DISCLAIMER.]

## LORD MAYOR'S COURT—ETHERINGTON v. WARD.

TO THE EDITOR OF THE MINING JOURNAL.

SIR,—With reference to the above action, I beg to inform you that I am the only Member of the Stock Exchange bearing the name of William Ward, and I was not the defendant in the case.—*75, Old Broad-street, E.C. Oct.* 28. WM. WARD.

# Meetings of Public Companies.

## BODIDRIS MINING COMPANY (LIMITED).

The statutory meeting of shareholders was held at the offices of the company, Coleman-street, City, on Monday,

Mr. A. W. THOMAS in the chair.

Mr. CUMMING (the secretary) having read the notice convening the meeting, the following report was submitted:—

*Nov.* 30.—Since commencing operations at these mines we have thoroughly repaired the buildings upon surface, re laid the dressing floors, and built a kiln for the reception of lead ores. Underground our operations have been confined to the main lode, and driving a cross-cut from this lode to intersect the Maes-y-pwl lode, which at surface presents a very strong appearance, and which will, doubtless, when fully developed prove highly remunerative. The chief object we have in view at present is to reach the junction of the main lode with the Craigiog lode; we are, therefore, driving with all possible speed the 30 and 45 yard levels upon the main lode, and according to the diallings this desirable object will be attained in a few (say, five) fathoms further driving eastward. The 30 yard level, east from the eastern shaft, is now extended from the eastern shaft 17 fms. 3 ft., of which the present company have driven 7 fms. 2 ft.; this level for the greater part of the distance has passed through a productive lode, and for 16 yards the lode was found unusually rich, considering the shallow depth, and will produce on an average 2 tons of lead, besides blende, per fathom, or a money value of 30*l.* per fathom. The ground thus driven through can be stoped away at some future time at about 5*l.* per fathom, and thus leave a large margin for profit. The 45 yard level east is extended from the shaft 35 fms. 3 ft., of which the present company have driven 8 fathoms; this level throughout has produced lead and blende, and has developed some good stoping ground, and we find the lode improves in value as we get nearer the junction. The end is now producing 15 cwts. of lead per fathom, and from its present appearance we anticipate a further improvement.

It must be understood that we have not yet taken away any lead other than by driving the levels, and all that we pass through adds to the reserves to be taken away upon the completion of the new drawing arrangements. In the 60 yard level we intend at once to put down a tramway to the western shaft, through which shaft in future we shall draw the leadstuff, as this is better adapted for drawing, and near the dressing-floors, and we shall then do away with cartage upon surface. We have before stated that we have not yet taken away any of the ore ground by stoping, but from the drivages we have obtained about 10 tons of lead, besides blende, half of which is ready for market, and the remainder in a forward state. As soon as the state of the weather will permit we shall commence the erection of the engine-house to receive such an engine as will enable us to rework the Craigiog portion of the property, from which we anticipate good results; we are informed upon good authority that the lode is productive, and at some points produces 3 tons of lead per fathom. In conclusion, we beg to state that we have every confidence in the capabilities of the mines, the prospects are undeniably very encouraging, and it is seldom lodes have been found at the comparatively shallow depth equal in richness. We shall soon be able to commence sales of lead and blende, which we hope steadily to increase, and have every reason to believe you have a permanent dividend mine.—A. W. THOMAS, H. HOTCHKISS.

The CHAIRMAN said the first business was to proceed with the re-election of the present directors, or elect in their place other gentleman, as the shareholders might think fit. The present directors are Messrs. Boulton, Thomas, Metcalfe, and Sharp.——Upon the motion of Mr. GREGORY, seconded by Mr. REYNOLDS, the directors were re-elected.——The CHAIRMAN then said it would be necessary to elect an auditor, and Mr. F. Wood offered himself for re-election.

Mr. GREGORY proposed Mr. Wood's re-election, and the motion having been seconded, it was unanimously agreed to.——The CHAIRMAN then asked the shareholders to fix the remuneration of the directors.——A SHAREHOLDER moved that the directors who attended should be paid a guinea for each attendance.——Mr. REYNOLDS seconded the motion, which was carried, with the understanding that the stipend be increased when the mine commenced dividends.——The CHAIRMAN then stated that the actual business of the company was completed, but he should be pleased to answer any questions shareholders might wish to put in reference to the mines.——Mr. HORTON: How is it proposed to make known to the shareholders the proceedings of the company?——The CHAIRMAN: Half-yearly meetings will be held, and weekly reports will be furnished to the chief mining papers.

Mr. HORTON: Will you send us news in case of any special discovery?

The CHAIRMAN: In the event of an improvement such as may warrant a rise in the price of shares that would be communicated to the shareholders at the earliest possible moment. The *Mining Journal* always gave faithful accounts of our progress, and the weekly reports, as furnished by the local agent, are to be found in that paper.

A SHAREHOLDER: There is one thing I should like to suggest. This is, of course, a young company and a young mine, but, nevertheless, people have asked when will it sell ore and pay dividends. Now, I think it would be a great mistake to tear away the ore and send it to market at present. Having recently visited the mines I do not hesitate to say you have one of the most promising mines that I ever saw, and when you were alluding to how the information was to be given to

the shareholders I thought I should like to say a word in reference to Captain Hotchkiss. There are few mines where I have found the value of the lodes under estimated. In his report he estimates the lode to produce 2 tons of lead per fm. Had I been called upon to report I should have valued it at half a ton more. The lodes are strong and masterly. You are in a limestone similar to the celebrated Minera Mines and there is one point you may expect shortly to see come off. That point is the junction of the Main and Craigiog lodes which you will meet in a few months, and I shall be much disappointed if a rich deposit of ore is not met with.——Mr. REYNOLDS, who had visited the mines, confirmed the account given of them by the former speaker.

Mr. HORTON strongly urged the board to develope the mines with all possible speed, as he had joined the undertaking with a view of early dividends, and not as an investment for his grandchildren. Was it possible to drain the mines by a deep adit, his impression being that this was the cheapest work done in mining?

The CHAIRMAN corroborated the statement made as to Capt. Hotchkiss rather under estimating the value of the mines than otherwise. They could commence sales at once, but did not think it well to do so. They had 5 tons of ore in the bin ready dressed, and another 5 tons in a forward state, but did not intend to stope away any of the reserves until they had every facility for returning the lead. Through the winter they would drive on the different levels to reach the junction before alluded to, and so lay open a large section of profitable stoping ground, and by the spring would be in a position to commence regular returns. They would also put down a tramway in the 60 yard level to enable them to draw the leadstuff through the western shaft at a greatly reduced cost. With regard to an adit level, he admitted its value in mining, but in this case it could only be attained at a considerable cost of time and money. To gain a depth of 100 yards the level would have to be commenced at a distance of nearly one mile from the present workings. He did not think it advisable to commence the erection of machinery at this unfavourable time of the year, but in the spring contemplated putting up such machinery as would effectually drain the whole of the property, and the estimated cost is 1500*l*. A drawing engine and crusher would ultimately be required, which would cost an additional 600*l*. He (the Chairman) frequently visited the mines, and would take care they were vigorously developed with due regard to economy. The lodes at the shallow depth obtained were found unusually productive, and he had every reason to believe the operations of the company would result in large and lasting profits.——The meeting terminated with a cordial vote of thanks to the Chairman.

## WEST GODOLPHIN MINING COMPANY.

The general meeting of shareholders was held at the company's offices, Great St. Helen's, on Tuesday.—Mr. R. WILSON in the chair.

Mr. CHARLES THOMAS (the secretary) read the notice convening the meeting, and the subjoined report from the agent:—

*Dec.* 2.—I herewith hand you statement of work done in the past four months, and distance driven and sunk in the different levels and shafts to the present date, with the value of the lode in the different pitches.—Caunter Lode: Pressure shaft has been sunk below the 60 4 fms. 1 ft. 5 in. The 60 has been driven north 4 fms. 0 ft. 3 in.—Wilson's Lode: The 60 has been driven west 7 fms. 5 ft. 8 in. The 60 has been driven east 4 fms. 3 ft. 6 in. The 50 has been driven west 16 fms. 1 ft. The 50 has been driven east 6 fms. 3 ft. 6 in. The 40 has been driven west 7 fms. 5 ft. 8 in. Boulton's shaft has been sunk 13 fms. 3 ft. The 20 has been driven east 6 fms. 1 ft. 6 in. The middle adit level has been driven west 10 fms. 2 ft. 10 in., and is communicated with Gladstone's shaft. A winze has been communicated from the 50 to the 60 west.—Caunter Lode: In Pressure shaft sinking below the 60 the lode is 6 ft. wide, and worth for the length of the shaft 35*l*. per fm.; sunk 8 fms. In the 60, driving north, the lode is 1 ft. wide—poor; driven 8 fms. 3 ft. —Wilson's Lode: In the 60, driving west, we have just got clear of the flookan, which heaved the lode south 2 fms. 1 ft. 6 in.; the lode is 3 ft. wide, worth 12*l*. per fathom; driven 50 fms. 1 ft. 3 in. In the 60 east the lode is 1 ft. wide, producing low price tinstuff; suspended until Boulton's shaft is through for ventilation; driven 49 fms. 2 ft. 7 in. In the 50 west we have cut through the flookan, and have driven south on the western side of it 2 fms. 3 ft. 9 in., but have not cut the lode, but judging from the appearance of the ground we think it near; driven 55 fms. 3 ft. 4 in. In the 50 east the lode is 2 ft. 6 in. wide, worth 5*l*. per fathom; suspended for want of ventilation; driven 55 fms. 4 ft. 2 in. In the 40, driving west, the lode is 2 ft. 6 in. wide, worth 8*l*. per fathom; driven 36 fms. 3 ft.

In the rise in the back of the 40, rising against Boulton's shaft, the lode is 1 ft. 6 in. wide; lode poor—raised 1 fm. 3 ft. 9 in. In Boultons shaft, sinking below the 30, the lode is 1 ft. 6 in. wide; lode poor—sunk 4 fms. 5 ft. 3 in. In the deep adit level, driving west, the lode is 4 ft. wide, producing low price tinstuff—driven 3 ft. In the middle adit level west the lode is small—suspended. No. 1 stope, in bottom of the 50 west, is 10 ft. wide, worth 30*l*. per fathom. No. 2 stope, in bottom of the 50 west, is 7 ft. wide, worth 20*l*. per fathom. No. 1 stope, in back of the 50 west, is 15 ft. wide, worth 30*l*. per fathom. No. 2 stope, in back of the 50 west, is 6 ft. wide, worth 8*l*. per fathom. No. 3 stope, in back of the 50 west, is 3 ft. wide, worth 5*l*. per fathom. No. 4 stope, in back of the 50 west, is 3 ft. wide, worth 5*l*. per fathom. No. 1 stope, in bottom of the 50 east, is 5 ft. wide, worth 15*l*. per fathom. No. 2 stope, in bottom of the 50 east, is 12 ft. wide, worth 30*l*. per fathom. No. 1 stope, in bottom of the 40 east, is 2 ft. 6 in. wide, worth 5*l*. per fathom. No. 1 stope, in back of the 40 east, is 3 ft. wide, worth 5*l*. per fathom. No. 1 stope, in bottom of the 30 east, is 1 ft. 6 in. wide, worth 3*l*. per fathom.—Caunter Lode: No. 1 stope, in back of the 60 south, is 2 ft. 6 in. wide, worth 6*l*. per fathom.

We have employed on the mine 125 men, 28 boys, and 24 girls. We have stocked at surface about 350 tons of tinstuff, and about 60*l*. worth of copper dressed and 20*l*. worth undressed. We have connected the new boiler at the pumping-engine, which is answering very well, and built a new oven at our burning house, and are pushing on the erection of the dressing machinery as fast as possible. We have been forced to fill up a large piece of ground with old burrow stuff and sand from the stamp floors, so as to get our new floors as high as possible for dressing; this is very nearly completed, so we shall now be able to make better progress in fixing our machinery. Our pumping and stamping machinery are all working well. I still think that we have in West Godolphin a great and good mine.—J. POPE.

PRICES OF MATERIALS CHARGED AT WEST GODOLPHIN MINE.

| Particulars. | August. | September. | October. |
|---|---|---|---|
| Best iron, per cwt. | — | 11s. 6d.–14s. 0d. | 11s. 6d.–14s. 6d. |
| Castings, to order | — | 9s.–10s.–12s. 6d. | 8s.–7s. |
| Rail iron | 9s. 0d. | — | |
| Cast borer steel | — | — | 36s. 0d. |
| Blister steel | — | — | 42 0 |
| Powder, per 100 lbs. | 36 0 | 36s. 0d. | — |
| Tonite, per lb. | 2 0 | 2 0 | 2 0 |
| Candles, per dozen lbs. | 5 6 | 5 6 | 5 9 |
| Timber (Norway), per foot.. | 0 10 | 0 10 | 0 10 |
| Fuse, per coil | 0 5 | 0 5 | 0 5 |
| Oil (Engelbert's), per gallon) | — | 3 9 | 3 9 |
| Coals (mining), per ton | 14 6 | 14 6 | 14 6 |
| „ (Cardiff) „ | 20 0 | 20 0 | 20 0 |

The CHAIRMAN was happy to be able to congratulate the shareholder upon the improved prospects and appearances of the mine since the last meeting. In the four months to which the accounts referred they had made a profit of 216*l*., and had expended 270*l*. upon new machinery which they had purchased, in addition to which they had stocked about 350 tons of tinstuff, worth 350*l*. They intended to get about 1000 tons at surface, so that they would not be stopped in the event of any accident to the machinery temporarily preventing them from raising ore. They had also about 60*l*. worth of copper dressed, and 20*l*. worth undressed, which would come to their credit. A flookan had disturbed the lode, but this was always considered a favourable sign for tin, and was likely to prove so in their case, as they had found the lode on the other side. The pressure shaft was going down in granite, and showed them that the tin did not cut out; indeed, it improved in value as depth was attained. At Wilson's shaft they were entirely in killas, and had favourable indications for copper. As they drove east they would pass through the granite and come into the killas again; in fact, it was one of the great recommendations of their mine that they were just on the junction of the granite and the killas, which was always acknowledged by miners to be favourable for the raising of mineral. They had sold 22 tons 16 cwts. of tin on Saturday, for 1027*l*. 8s.; that was for the four weeks, and was the largest sale they ever had. Against this the cost would be about 751*l*., so they would have nearly 250*l*. profit. If they could go on in this way for a few months they would soon be in a very satisfactory position. Even with the present price of tin they would soon be able to enter the Dividend List. Every debt was paid up to Oct. 14, and charged in the accounts now presented, and they had that day paid up all accounts to Nov. 12, so there was only the current month's accounts open, and this was charging up as closely as possible; there were, indeed, few mines in Cornwall where the costs were charged and paid so close up.

A SHAREHOLDER enquired whether they would require much additional machinery for carrying on the mine?——The CHAIRMAN said that they would not. They proposed to put up eight more heads of stamps, and the engine was sufficient to drive these; and the engine was also of sufficient power to enable them to take the mine down 20 fathoms deeper.

A SHAREHOLDER thought the lode appeared to increase in value as they increased in depth.——The CHAIRMAN said there was no doubt about that. They must remember, too, that they were but 60 fathoms deep, which was only the depth at which most mines in the neighbourhood commenced to make tin.

Mr. C. THOMAS said that the 60 fm. level was really 100 fms. from surface, because their adit level was 40 fms. deep. As to the 250*l*. profit, he might explain that that was on the tin alone. The copper would also have to be included, and yielded a little profit. All the levels driving on Wilson's lode east were coming into copper.

The CHAIRMAN had that morning received a letter from Captain A. Waters, of Shrewsbury, in which he said that on their great lode they had a splendid tin mine.

Mr THOMAS said that when Capt. Waters was there they had only just opened on Wilson's lode, yet he regarded the indications as very favourable. Where their lode was so rich now was parallel with the point where profits were made some 20 years ago by former owners, and dividends paid of considerable amount—this was when the mine was worked as North Great Work. We have many lodes in the sett, and to explore them all would cost much money; but if their prospects continued as they were at present they would open on some of those lodes.

The CHAIRMAN might mention that Capt. Pope considered that the ore open in the 60 would enable them to keep up 20 tons per month until they got to the next level.

A SHAREHOLDER enquired the price at which they were selling their tin.

Mr. THOMAS said they had sold at 46*l*. per ton, but for yesterday's parcel they would receive but 44*l*. 2s. 6d. owing to the 3*l*. drop in the tin standards announced the previous day.

The CHAIRMAN remarked that in many Cornish mines a dividend would have been declared that day, as they had a credit balance of 463*l*. after paying everything.

Mr. THOMAS said it was quite that, and there was the copper which might have been sold and brought into the accounts had they not considered the quantity too small. Taking credit for this copper would have raised their balance to 500*l*. The actual profit for the month was over 300*l*. At the next meeting they would be in a position to make a dividend, but of course the committee would consider whether it was desirable to do so. The committee and manager really held over three-fifths of the mine.

The report and accounts having been adopted, thanks were voted to the Chairman and committe, and the proceedings terminated.

## GREAT SNAEFEL MINING COMPANY.

The annual meeting of shareholders was held in St. James's Hall, Douglas, on Wednesday,—Mr. H. B. NOBLE, Chairman. Amongst those present were Messrs. G. Barber, J. Quine, R. Roney, J. Cowin, J. C. Cannell, T. Brew, T. Fisher, G. Maley, and W. E. Young (secretary). The accounts showed that the total receipts had been 1829*l*. 9s. 7d. The labour cost of the year amounted to 990*l*. 10s. 9d., and the merchants' bills to 282*l*. 18s. 4d. The balance brought down was 162*l*. 2s. 2d. The liabilities of the company amounted to 192*l*. 8s. 6d., and the assets to 513*l*. 13s. The secretary read the reports of the directors, auditor, and manager.

The CHAIRMAN said: In addition to the explanatory reports of directors and agent, there remains very little to add, the operations at the mine being confined to sinking the shaft, which is progressing to the entire satisfaction of the directors, and when this is completed to 130 fms. they purpose driving a level there, and to resume driving the upper levels recently suspended. The secretary goes underground monthly to measure the work done, and in this respect he is very competent. I have only to move that the accounts and reports be passed. He (the Chairman) invited the shareholders to ask any questions, to which he would be glad to reply.

Mr. MALEY said he highly approved of the mode adopted in sinking the shaft, and as far as his experience in mining in the Isle of Man went, the amount of work done was exceedingly satisfactory.

Mr. J. COWIN thought as the secretary had increased duties to perform he should have some increased pay.——The SECRETARY said at present he was quite satisfied.

The election of Messrs. T. Fisher and G. Sherwood was confirmed.——Proposed by Mr. BREW, and seconded by Mr. BARBER, that Mr. J. Goldsmith be elected as auditor for the ensuing year.——Carried unanimously.

Mr. MALEY moved a special vote of thanks to the Chairman. From his personal knowledge Mr. Noble devoted time and attention to the company's interest, and well deserved the thanks of the shareholders.——Mr. RONEY (a director) said he could endorse all that Mr. Maley had said. The Chairman visited the mine in all weathers, when younger men would shrink from it. He had great pleasure in seconding the motion.

The CHAIRMAN acknowledged the vote, and said he would continue to do his utmost to promote the interest of the company. He was a very large shareholder, and he had great hopes the mine would prove a success with a little patience and perseverance.

## WEST ASSHETON MINING COMPANY.

The general meeting of shareholders was held at the company's offices, Bartholomew House, on Thursday,

Mr. H. D. BROWN in the chair.

Mr. H. WILSON (secretary) read the notice convening the meeting.

The CHAIRMAN moved that the report and balance-sheet be received and adopted. Much progress had been made during the last eighteen months, and the shaft had been sunk to the 80 fm. level. No course of ore had yet been cut, but they had good indications. They had received a supplementary report that morning, which stated that the 60 west continued to improve, and was worth 20*l*. per fathom. A telegram just received stated that there was a further improvement. The Tan-y-Bwlch is now making profits of 800*l*. or 1000*l*. per month, and it was at the 60 that they commenced to make profits. Their experience was that the lode at the shallow levels was not to be depended on. They will sample 10 tons on Monday next, which will be the first sale. They had sufficient money to go on with the mine, and the lead sale will produce 150*l*. They propose to sink the shaft to the 100 fm. level, and it is thought that they will have better results deeper, he thought that they would then be able to work more economically. He did not doubt that they would have a good mine shortly. A return of 50 tons per month would pay a handsome dividend on the whole share capital.

A SHAREHOLDER said that the same opinion had been expressed for several years. He complained that the accounts had not been forwarded to the shareholders before the meeting.——Mr. SCHOFIELD said it was intented to send out the accounts on this occasion earlier, but it was found impracticable to do so.

The CHAIRMAN regretted that the report and accounts had not been sent, but promised that in future they should be forwarded at least a week before the meeting.

The report and accounts were then carried unanimously. Messrs. James and Thos. Gundry were re-elected directors, and Mr. W. T. Smart was re-appointed auditor.

Mr. SCHOFIELD thought that if the progress continued as heretore they would shortly have a rich mine.

The CHAIRMAN, in reply to an enquiry, stated that Tan-y-Bwlch, was 170 fms. from the company's mine.

The usual complimentary vote of thanks to the Chairman and directors terminated the proceedings.

## ASSHETON MINING COMPANY.

The ordinary general meeting of shareholders was held at the company's offices, Bartholomew House, on Thursday,

Mr. H. D. BROWN in the chair.

Mr. H. WILSON (secretary) read the notice convening the meeting.

The CHAIRMAN remarked that what they had done for Assheton was very similar to what had been done in West Assheton, except that they were driving east instead of west. They had had deposits of ore, and hoped for better things, owing to the appearance of Tan-y-Bwlch. They were about paying cost, and the directors had much faith in the ultimate success of the mine. The directors had gone on finding money, and they had now sufficient funds to go on for some time. A supplementary report stated that a good branch of ore had been cut in the last few days, and the agents recommend the driving of the 50 east of Mawr shaft. The agents think they ought to see the lode 30 fms. deeper. They had not yet been able to pay a dividend to the shareholders, but they hope when they have gone deeper to be well remunerated for their outlay. They proposed to go on working the mine, and hoped to discover something good; and it was satisfactory that they were even now getting enough ore to meet cost. The same objection as to sending out reports and accounts applies to this mine, and he would at once undertake that this should be remedied in future. He formally moved the reception and adoption of the report and accounts.

A SHAREHOLDER enquired upon what terms the loans to the company had been made, and also the cause of the retirement of Messrs. Rudge and Lindow?——The CHAIRMAN said that the 993*l*. was cash advanced by the directors, for which they hold no security. As to Messrs. Rudge and Lindow, it is difficult to say why those gentlemen resigned—both had been in very ill health.

The report and accounts were then unanimously adopted, Messrs. W. James and John Schofield were re-elected directors, and Mr. F. W. Smart was re-appointed auditor.

Mr. BATTERS did not see why the mine should not turn out as well as the neighbouring Tan-y-Bwlch, which had just been sold for a large amount.

The usual vote of thanks was then unanimously passed and acknowledged, and the proceedings terminated.

## WEST GOGINAN SILVER-LEAD MINING COMPANY.

An extraordinary general meeting of shareholders was held at the company's offices, East India Avenue, on Thursday,

Mr. BROOKES in the chair.

The SECRETARY read the notice convening the meeting.

The CHAIRMAN said he had really very few remarks to make, for they had merely to confirm resolutions already agreed to. A month ago they had a meeting, and it was found that they could not carry out what they desired without a special meeting, and another to confirm whatever might be done there. The three meetings had been a little troublesome, but it merely caused a little delay. Since the first meeting they had very encouraging letters from several shareholders, and he might especially refer to one from the largest shareholder, who offered to take his full *pro rata* proportion, and another letter from a shareholder, who offered to take 150 more than his *pro rata* in the event of the whole of the shares except that number being taken. He was himself the next largest shareholder, and was quite willing to take his proportion, or even more. He was not aware that any further remarks were necessary; he would, more. He was not aware that any further remarks were necessary, he would, therefore, at once move—"That the capital of the company be increased from 24,000*l*. to 28,000*l*. by the issue of 2000 shares of 2*l*. each," and "That the profits applicable for dividends in any one year be appropriated in paying a dividend up to 10 per cent. on new shares, then in paying a dividend up to an equal amount upon the ordinary shares, any surplus remaining to be divided equally between both classes of shares. When in any year 10 per cent. shall be paid upon the ordinary shares, the preference in favour of new shares shall cease, and all shares shall thereafter rank alike for dividend, and in all other respects."

Mr. ROSS had pleasure in seconding the motion, and would like the secretary to state what was the proportion of the ordinary to the preference shares?——The SECRETARY said one in six.

The CHAIRMAN said that the present capital was 12,000 shares, and they proposed to issue 2000 more. They proposed to call 10s. on application, 10s. on allotment, and the remainder as required. With regard to the employment of the money, he thought it should be applied entirely for profitable or absolutely necessary work; Mr. Kitto, however, would give them the best information on that point.

Mr. KITTO said that his plan would be to sink the main shaft, and to do no more driving than was necessary to reach the bunch of ore which at the 24 was a little over 20 fms. from the shaft. That being reached he would put in winzes to keep the ventilation right. He was of opinion that they would have a paying mine about two levels deeper. It was most desirable to drive the 36, although they had 20 fms. of dead ground to go through. It would be possible but impracticable to drive the 48, and connect the 48 and the 24 by a winze; they would have no ventilation to do it. They only proposed to drive for the ventilation, and did not intend to drive an inch beyond the ore. They would, no doubt, ultimately have to drive east, indeed the lode was promising in that direction. If they saw something better in deeper levels they would, of course, drive east, but not until they had seen more.

A SHAREHOLDER enquired how long it would take them to get down to the 50?

Mr. KITTO said they could not reckon on more than 2 fms. per month, and it would cost about 20*l*. per fathom. The sinking was very difficult, owing to the tough nature of the ground, bnt when they got away from this sort of stuff they appeared to be getting into more compact ground at the bottom. The use of dynamite has lessened the cost about 4*l*. per fathom.

The CHAIRMAN asked how much money he would require to take them to success?——Mr. KITTO said the calculation had recently been made, but he did not recollect the exact figures, but the cost would be about 150*l*. a month.

The CHAIRMAN said it appeared to him that there was much work to be done, but that it would cost more in time than in money.

Mr. KITTO said that if they got the 4000*l*. proposed they would have plenty of money. Their machinery was excellent—in fact, there was not a more compact bit of machinery in the Principality.

The resolution was then put to the meeting, and unanimously agreed to.

Mr. KITTO said that he had such confidence in the mine that if the whole of the shares were not taken by those entitled to them he would be glad to take three or four times his quota.

Mr. ROSS suggested that no one should be allowed to pay up his shares in full, as he considered it undesirable to charge the capital for the payment of the additional interest which would thus become payable, instead of applying the whole to the working of the mine.

The CHAIRMAN thought the suggestion a good one, and he might mention as a favourable feature in the concern that the original promoter had never sold a share, and now held over 2000. That certainly showed his confidence.

A cordial vote of thanks was given to the Chairman and directors, and the meeting separated.

## PARYS MOUNTAIN MINES COMPANY.

The general meeting of shareholders was held at the company's offices, St. Helen's-place, on Thursday.

Mr. J. Y. WATSON, F.G.S., in the chair.

Mr. F. R. WILSON (the secretary) read the notice convening the meeting, and the report and accounts were taken as read.

The directors' report states that the accounts are for nearly 11 months, and they show—Sales of copper ores, 3278*l*. 18s. 3d.; profit on precipitate pits, 958*l*. 4s. 2d.; sulphur, 339*l*. 6s 2d.; native ochre, 38*l*. 15s.; blue stone, 9*l*. 7s. 9d. The costs during the same period have amounted to 6962*l*. 15s., Owing to the loss thus shown it became incumbent upon the directors to issue a portion of the reserve shares, and consequently 3573 were offered and taken up by the shareholders at 10s. per share, leaving 1500 still unissued. During this period of more than 10 months the ochre has been collecting in the pits, and is preparing for the market: this is valued by the agent at 1200*l*., and would have materially lessened the loss shown in the accounts had it been sold or even credited. The profit on the precipitate pits has been 958*l*. 4s. 2d.

The statement of assets and liabilities shows a balance in favour of the company of 2307*l*. 1s. 8d., after charging 700*l*. for costs not yet due. In regard to the mine, the agents' report enters into a full explanation. The 90 cross cut south, to which so much importance is attached, has now been driven altogether 110 fms., and is at the point where one of the great lodes of the district should be met with, and the agent is strongly impressed with the idea that this main lode when cut will be very productive. This point, so important to the welfare of the company, and from which so much has been expected for a long time past, has caused the directors some anxiety, but the agents seem sanguine of success, and a good lode at this point, which may be met with any day, might soon repay the shareholders for all their outlay and perseverance.

The agent's (Capt. T. Mitchell) report states that the number of hands employed in the mines underground in the drivings, stoping, and on tribute is 74; pitman, 1; timberman, 1; skipfillers, 2; trammers, 4; and at surface in the various departments, 60 men, boys, and girls, making a total of 142 hands. The engines and pitwork are all in good condition, and working well.

The CHAIRMAN did not know that they had anything to add to their report, but he would be glad to answer questions. Captain Mitchell was present, and would explain the state of the mine, more particularly as regarded the 90 cross-cut south, and the plans, showing the great importance of this point, should be carefully studied by every shar-holder. From Colonel's shaft, at the bottom of the open-cast, four lodes had been cut, and worked very rich beyond it above the 45 fm. level, and had never been below; this cross-cut would intersect all of them at 90 fms. deep, and one of them was close at hand.

Mr. WILSON said that if they cut the lode as expected at the 90 they would have 45 fms. of backs.——The report and accounts were then received and adopted, and Mr. F. Braby was re-elected a director.

Mr. BRABY said the principal point of interest was the 90 cross-cut south, the great object of which was to get under the great open-cast. We shall get deeper by this means than at any point yet reached. Much water naturally accumulated in the open-cast, and the Colonel's shaft proved that copper existed at the bottom, but the expense of pumping prevented its being profitably worked. They had now pumps which would not be corroded by the sulphate of copper, and as all the other lodes had lasted down to the 120 there was every reasonable supposition that they would find a great mass of copper at the end of the 90 cross-cut.——Mr. Dick was re-appointed auditor at ten guineas a-year.

Capt. MITCHELL explained the plans. The great open-cast formerly gave more than 5,000,000*l*. profit, and they have four known lodes to cut at the 90 fm. level. When they get under the over cast it will be drained, and the water will come back to their powerful machinery. They might, he thought, be within 4 or 5 fms. of the first lode. The lodes had been very valuable above the 45 on the east side of the sett. They intended to work at the 90 under the open-cast. The 90 cross-cut was also important because it would open up the ventilation. They were not yet paying cost, but in the Mona Mine the lodes were very productive, and they could not tell to a day or week when they would cut it.

Mr. BRABY said a large quantity of ochre was on the mine, for which they wanted a market.

Mr. WILSON, in reply to a shareholder, said that the cost was between 600*l*. and 700*l*. per month, and they were losing about 200*l*. per month.

The CHAIRMAN said that the raising of the ochre was already paid for. The Captain estimated it at 1200*l*. worth.

A SHAREHOLDER said that by the skilful management of the directors they had lost 350*l*. per year, and enquired whether the directors had no control over the management?

The CHAIRMAN said they were getting 2*l*. per ton less for copper than when they commenced, but if copper ore went up only 1*l*. per ton there would be a profit.

Mr. BRABY thought there was no doubt that the copper was there, but at present price it would not pay to raise it.

A SHAREHOLDER thought that the issue of shares at a discount was extremely detrimental to *bona fide* holders, and brought the company from bad to worse.

Mr. MITCHELL said the money could not be raised by any other means, and the directors held one-eighth of the shares. If the new shares had been offered at 3*l*. per share none would have been taken.

The usual complimentary votes of thanks terminated the proceedings.

## TOLIMA MINING COMPANY.

A meeting of shareholders was held at the offices of the company, Finsbury-circus, on Wednesday,—Mr. H. T. SANKEY in the chair.

Mr. W. W. HOLMES read the notice convening the meeting, and the report of the directors, which has already appeared, was taken as read.

The CHAIRMAN, in moving the adoption of the report, said: Our report is so much *in extenso* that there is very little left for me to say without unnecessarily taking up your time. Before adverting to the mine, I must allude to the melancholy circumstance under which I appear here to-day as your Chairman. You, as shareholders, and much more we as directors, have sustained a severe loss in the death of our Chairman, Mr. Barrow. (Hear, hear.) Mr. Barrow brought all his abilities and energies to bear upon this company; he had great faith in its ultimate success, and practically proved it by becoming, along with his family, by far its largest shareholder. As far as we know, his representatives have still that confidence, and have not the slightest idea of parting with their holdings. Mr. Bridgman Langdale Barrow, a son of the deceased, has, at our request, consented to join the board, and perhaps the best way in which I personally can show respect to our late friend's memory is by following his example, and doing what I can to bring this company to the success he hoped to see it attain. Now, as to our present report. Though we appear before you to-day without recommending the payment of a dividend, yet we are in happier circumstances than we have been hitherto, because we can now say that the works at the Frias Mine are complete. Those of you who have watched the reports from time to time will see that we have extracted a yearly average of a little over 4000 tons, but during the past year we have extracted 4684 tons, notwithstanding the mine was nearly 10 weeks under water. That output produced 198 tons of export ore, the average of the last four or five years being about 220 tons. The cost has been somewhat larger, owing to the necessity for replacing some of the machinery, especially the whim-wheel, and the geueral repairs. We have also, unfortunately, had to put up with the serious illness of Mr. Lucas, our superintending engineer. Indeed, so ill did he become that his life was despaired of, and his coffin was ordered, which he subsequently, on his recovery, had to pay for. Mr. Lucas's report to us is most satisfactory, inasmuch as he assures us that there is no probability of our ever falling short of material—good export material—to bring to surface. That being so, of course you will see that all that is required for success is that our energies should be devoted to securing the greatest economy in the carriage from the mines to Honda, a distance of 35 miles. It is a wretched road, and the natives take 12 hours to do work which we should easily be able to do in six. Mr. Powles has that fully in view, and has done a great deal beyond what Mr. Lucas did previously to alter the heavy expenses we were put to. Mr. Lucas succeeded when he was there in making more favourable terms with the river company than they had previously granted. There are two river companies, and they joined hands in making excessive charges upon us for transporting the ore from Honda to the point where it has to be put upon the Royal Mail steamers. Mr. Lucas succeeded in making much more favourable terms with these companies than we formerly had. Another point which has caused us serious consideration is the realisation of the ores in England. Our report shows that we have not had the trouble which formerly we were put to respecting the assays. Our assays in England and realisations are fully equal to those of Frias, and in some respects have gone beyond them. The directors are now considering very seriously whether it is possible that they can do anything towards a better realisation by treating the ores over there, or selling them to better advantage in England. We are not inclined to think that we can successfully smelt over there. As respects the Alto Gold Mine, you will see that there we have not got fully into the work,

but credit is taken for 300*l.* or 400*l.*, which is merely the result of trial washings. The ditch has been completed for three or four miles, and though a good portion has yet to be made, the difficulties are not so great as those we have already encountered. Indeed, it is hoped that from future washings we shall get enough money to pay the costs of this work. The country is a most difficult one for purposes of this kind. It is impossible to make a survey except a very few yards in advance of where you are, and occasionally the water has to be carried over rocks by launders or troughs. Mr. Powles writes to say he thinks the greatest difficulties have been overcome, and in that Mr. Lucas concurs. You are all aware that a civil war is proceeding in Colombia, and at the present time we are unable to ship any ore at Honda at all; in fact, hardly able to extract any from the mines. The men are afraid of being impressed, and will only work where they are concealed from observation. That is a difficulty which we hope soon to see removed by the restoration of peace, but it hampers us very much just now. They have had some rather bloody engagements, and when a few thousands are killed perhaps they may see the necessity of bringing the strife to a close. Mr. Lucas is present, and will be happy to answer any observations, and so also will I, on matters that may be within my knowledge. I now formally conclude by moving the adoption of the report and balance-sheet.

Mr. ROGERS: In seconding the report I had intended to say a few words relative to the gold washings. I do not think that the shareholders have any idea of what a valuable property they have in these. Since the meeting held last year the result of some operations carried on at the neighbouring mine of Malpaso, working upon a similar deposit but of far poorer quality, have been most encouraging: 1500*l.* of gold was obtained in a month, at a cost of about 400*l.* Now, this result was obtained with a less quantity of water than we hope to get eventually at our mines, and with gravel that is so poor, as compared with our gravel, that to make it pay by any process but the hydraulic would not be possible, whereas our gravel pays well worked by the common process of the country. It may be some time yet before we get the water we require; but when we do the share-shareholders will soon see the value of these mines.

A SHAREHOLDER commented on the circumstance that the company's engineer now found the pumps inadequate to the requirements of the mines. How was this not found out before?

Mr. ROGERS: One of the principal reasons why additional pumps were required was that soon after Mr. Lucas go there they broke into some immense old Spanish excavations, and the water found in them nearly drowned the mine, which naturally was dry. Hence, when the water came suddenly upon them the machinery was inadequate to cope with it. The mine was gradually getting deeper: 10 fms. made a wonderful difference.

A SHAREHOLDER said he always understood that machinery was erected to deal with the mines in depth, because their only hope of success lay in going deeper.

Mr. LUCAS said they did not start with sufficient machinery to carry them down to the 40 fm. level. No mine did. They were obliged to increase their power of pumping. A neighbouring mine had been in the same position.

Mr. THOMPSON thought the better way was to let bygones be bygones, and look to the future. He noticed in the report that there was ample power for pumping water at the present moment, but they could not go on under the assumption that the mine was going to remain at a depth of only 40 fathoms; in fact, the mine was no depth, comparatively speaking. How long did the board think the present machinery likely to last?

Mr. LUCAS said the water-wheel he himself erected was new, and was adequate to three or four times the pumping required for the next two or three years. They would require more pumping-rods, but being of wood they were not expensive. The manager hoped not to tap any more water, but if he did he would have to put up another pump-barrel, which would have to be attached to the same pump-rods.

A SHAREHOLDER: What has been done with the machinery which cost 1000*l.*?

Mr. LUCAS: Some of it has been sent to Frias, at a cost of 6*l.* a ton from Honda, and the rest is stored at Honda.

The retiring directors, Mr. B. L. Barrow and Mr. C. O. Rogers, were re elected; and also Mr. L. H. Evans and Mr. Morgan the auditors.

A vote of thanks to the Chairman and to Mr. Lucas, the late manager, terminated the proceedings.

## WEST WYE VALLEY LEAD MINING COMPANY.

The first ordinary general meeting of shareholders was held at the Cannon-street Hotel, on Thursday,

Mr. Ross, F.R.G.S., presiding.

Mr. H. R. MOORE (temporary acting secretary) read the notice calling the meeting. The report of the directors, which has already been published, was taken as read.

The report of the manager was as follows:—

*Dec.* 1.—I have much pleasure in handing you my report for the general meeting of the shareholders, to be held on the 7th inst., and I think we may fairly be congratulated on the progress made in every department, both above and below ground, and more particularly so with the improved prospects in the latter, during the first year of the company's operations. A great deal of exploratory work has been done underground, which you will gather from the following remarks, together with their results; and at surface nearly the whole of the preliminary works have already been accomplished, with the exception of the erection of dressing machinery, and to which I shall hereafter refer. The sinking of Brooke's new shaft towards the eastern end of the property has received especial attention, as it is from this point that we expect to reach (in much less time than we could possibly do from the main engine shaft) the runs of ore ground which we believe to exist in this part of the sett, which adjoins the Wye Valley Mine; besides this it was absolutely necessary to have a second shaft for ventilation, and for an outlet for the stuff from the eastern workings. This shaft has already been sunk 25 fms. 3 ft., and is now within 2½ fms. of the same depth as the 26 fm. level, which is being driven towards it from the main engine-shaft, and as soon as we reach this level, which will occupy about five weeks, we shall immediately commence to drive towards the same in order to facilitate a communication, and at the same time shall drive eastward towards the ore ground referred to above.

The 26 has been driven east from old engine during the past year 47 fms. 2 ft., and is now within 30 fms. of Brooke's shaft. In the driving of the level we have passed through two distinct runs of lead ore, varying in produce from 10 to 30 cwts. to the fathom. This ore is now available for stoping, and is standing in whole ground between this and the 14. The 14 has passed through the same runs of ore, and has been driven altogether during the year 22 fms. 1 ft., but as in going eastward it was getting into shallower ground, and too near the surface to be productive of much good, it was thought advisable to suspend it. The driving of the 40 has not long been commenced; this has been driven 8 fms. east and 7½ fms. west, and has been productive of ore for nearly the whole distance, and in some places in paying quantities. The general character and composition of the lode is, in my opinion, superior to anything we have seen in the levels above, and I have no doubt whatever that when we reach the runs of ore that we have driven through in the upper levels we shall find them considerably improved in value; in fact, I consider our prospects underground are of a highly satisfactory character, and such as can scarcely fail to be productive of profitable results at no distant date. At surface we have laid out the ground for dressing-floors, completed the necessary walling, with the exception of wheel pits and house for crushing-mill; have erected a new water-wheel, which pumps the water and draws the stuff from Brookes's shaft, and to which is also attached a saw mill, and we have a 30-ft. water-wheel for driving crusher and other dressing machinery already delivered on the mine, and early in the spring of next year we shall commence to erect the necessary dressing machinery, and by the time that it is completed we shall be in a position to begin, and continue, to make regular sales of ore. We have partially constructed a very large reservoir, but have suspended this for the winter; as soon, however, as longer days and fair weather set in this will be resumed, and when completed will contain sufficient water, in the driest of seasons, to enable us to continue all operations throughout the year without interruption. We have also erected four very good miners' cottages, which will supply sleeping accommodation for 32 men, besides the occupiers; two of these are nearly finished, and I hope to have the whole completed by the end of this month. All the machinery throughout the mine is in excellent condition, and is working most satisfactorily, and the mine altogether is in a thorough and efficient state of repair.—JOHN KITTO.

The CHAIRMAN said he would supplement the information contained in the report by a few remarks, after which he should have pleasure in listening to the criticism and cross-examination which it was the duty of the shareholders to administer to those whom they had thought fit to entrust with the management of their capital in this concern. He hoped they had perfectly in their minds the facts stated in the prospectus, upon which they applied for their shares, and also remembered what was stated at the four-monthly meeting, and had carefully read the manager's reports which had been sent to them every month, and he hoped they had done that, because however high the directors might stand in the estimation of shareholders, it was not right that the shareholders should accept the statements of the directors without seeing proofs. Proceeding to comment on the accounts, he said that they were for the first year ending Oct. 31 last, and the directors, in the report, stated their full and earnest belief in the value of the mine, and the manager would be happy to supplement that information by giving any details which might be desired by the shareholders. It was satisfactory to know that every share in the company had been subscribed for, and there was not present in the accounts the item of shares not yet allotted. On the other side the purchase of the mine stood at a high figure; but it must be remembered that the property came into the market after the great discovery at the Wye Valley, and the somewhat sanguine views of the proprietors at the time had been up to the present fully borne out. The directors, in their purchase of the mine, were not satisfied to rest upon their own opinion as to the value of the property, but other persons who were well qualified to judge endorsed the opinion of the directors as to its value. Passing over one or two minor items in the accounts, he went on to say the preliminary expenses 750*l.*, might seem somewhat high, but really it was a small and moderate amount—it was an item which no public company could get on without, and he should be justified in saying that preliminary expenses were to a company what barnacles were to a new ship—they must have them at first, but they would get rid of them as soon as possible. This was what the directors were doing, and an amount would be written off year by year, until they were all gone. In reality, however, the preliminary expenses would be found to bear a moderate proportion to the amount of capital subscribed. The discount on the pre-payment of calls on shares was a considerable amount, and no doubt this arose from a growing disposition on the part of shareholders to get rid of their liability on shares as promptly as possible. Many years ago it was the fashion for limited liability companies to have shares with a small amount paid, and a considerable amount outstanding, but this had all been reversed, and now-a-days the moment a gentleman invested in shares he sought to get rid of his liability, and this was the cause of the considerable amount which appeared as discount on the pre-payment of shares. The only way to avoid it on any future occasion would be to be rather less liberal to those who wished to pay up in advance. The law expenses seemed to be somewhat heavy, but there was a great deal of work to be done, and the lawyer had had to go down to the spot, and there were hotel and many other expenses, and the amount which was charged was not simply for drawing leases, stamps, &c. The various other outlays in the accounts were moderate, and called for no comment from him, unless in answer to any questions which might be put to him regarding them by any gentleman in the meeting. There was an item of interest on deposits bearing interest 110*l.* 10s. 6d., but it was balanced by a similar entry on the other side. Their financial strength was shown by the fact that there was cash in hand and on deposit to the extent of 6072*l.* The prospectus stated that a guaranteed interest at the rate of 10 per cent. would be paid for two years; well, two half-yearly dividends had been paid, and there was sufficient money in Consols in the hands of trustees to pay the two remaining dividends, and he believed that Mr. Kitto would say that as soon as the guaranteed dividend was expired he would be able to pay the same and he hoped progressively larger dividends. (Cheers.) With regard to the future prospects of the lead trade, a gentleman well acquainted with commercial affairs had recently asked him whether the large number of new lead mines which were in course of being opened would not make an impression upon the price of lead. Now, he had ventured to reply in the negative to that question, and he had drawn up a few figures on this subject, which he would submit to the meeting in support of his view of the case. He was only in a position to give them the statistics of the year 1875, which might be taken as a fair guide. The whole produce for the year 1875 amounted to 77,746 tons, and the imports from abroad to 92,088 tons, making altogether a total of 169,834 tons, whilst there were exported 38,992 tons; it therefore followed that the home consumption alone was no less than 130,846 tons, and as the home produce amounted to 77,746 tons, it followed that we consumed in 1875 more than we produced by 53,096 tons. He thought that one fact would go a very long way to satisfy the minds of investors in lead mines—that there could be no possibility of reduction of price due to excessive production at home. The counties which raised the greatest quantities were—22,000 tons from Durham and Northumberland, 9000 tons from Montgomeryshire (including 6000 tons from the Van Mine alone), 8000 from Shropshire, and 6000 from Cardiganshire. Spain sent some manufactured lead, and Italy, Portugal, and Belgium had also sent small quantities. The chief customers had been Russia and China, and Germany had also bought a small amount. Russia during the last year took only 3609 tons, when there was no talk of war, and during the ten months ending Oct. 31, 1876, she had taken 141 tons less than for the ten months in the year preceding, which would show that the lead trade with Russia ahows no desire on the part of the Russian Government to manufacture the lead into bullets. It was not necessary to go on giving statistics, because he had stated sufficient to show that any depression which had occurred in the price of lead was simply one of those fluctuations in price which might occur in any article of commerce, and they might safely infer that the future of the lead market was one of the most brilliant they could desire to see. He went on to say that the company was now working on the same vein which had proved so productive in the neighbouring Wye Valley, which was also under the management of Mr. Kitto, and there was no doubt that that lode was one of the most remarkable lodes which could be seen in the county. He described the geological formation of the vein and surrounding ground, and pointed out that it was a lode such as this, and embedded in this formation, that the late Sir R. Murchison had said, in his great work on "Siluria," would produce gold. It was, therefore, evidently Sir Roderick's opinion that if gold were to be found in the district this was the class of vein and the conformation in which it would be found. Of course, he did not for one moment wish the shareholders to suppose that he intended to lead them to expect gold in the mine, but he mentioned it to show the splendid nature of the property. As regarded Mr. Kitto, they all knew how cautious he was in any statement which he made, and, therefore, they might receive with the utmost confidence any expression of opinion which he might venture upon. In conclusion, he (the Chairman) moved the adoption of the directors' and manager's reports and accounts.

Mr. KITTO, in answer to Mr. LANE, said that at present there was no large amount of ore on the surface, as his efforts had been devoted to properly opening up the mine, in order to be in a position to put lead regularly on the market by the time the guarantee expired. Of course, as the work proceeded quantities of ore were left in reserve; it was difficult to estimate the quantity, but he could state roughly that it was a very handsome amount. There was a plentiful supply of water for the water-wheel, and he had no trouble in the mine with regard to water. He answered some questions of minor importance, and said that he was happy to corroborate what the Chairman had said with regard to putting ore on the market before the guarantee was expired, sufficient to at least maintain the present guaranteed rate of interest; he had no doubt at all that he should be able to do this, and he presumed that was really the point which the shareholders wished to get at. (Cheers.)

Mr. F. DRAGE then seconded the resolution for the adoption of the report and accounts, which was put to the meeting, and carried.

Mr. W. B. Pike was elected auditor of the company, and he stated that he found all the accounts to be very well kept.

A cordial vote of thanks was then passed to Mr. Kitto for his able management.

Mr. KITTO acknowledged the compliment, and said that in looking after the interests of the shareholders he was also looking after his own, inasmuch as he was a large shareholder in the company.

A vote of thanks was passed to the Chairman and directors, and the meeting broke up.

## GAULEY-KANAWHA COAL COMPANY.

A general meeting of shareholders was held at the offices of the company, Queen Victoria-street, yesterday,

Professor ANSTED in the chair.

The SECRETARY read the notice calling the meeting, and the balance-sheet and statement of accounts.

The CHAIRMAN said he had very few words to say with respect to the balance-sheet before proposing that it be received and adopted. The American expenses, the principal thing, had been kept down to a very small sum, in consequence of there not having been sufficient to carry on the works. The other expenditure was small. The company unfortunately was not in a much better state than this time last year, as the directors really had not had the means of doing much. The directors were aware that the providing and selling of coals in the district was not an unprofitable operation, and in some of the neighbouring mines the works were being carried on at a profit, and the directors of this company hoped soon to be able to raise a sufficient amount of capital to go into the market, and, as he had said before, and as he now repeated, if they could only go into the market the mine would begin to pay almost from that moment, and the company would be in a better position, and the directors would be able to meet the shareholders with a larger amount of satisfaction. It had been a source of annoyance to the directors that they had not been able to go on with greater rapidity, but the expenses had been heavy in consequence of not being able to carry on the works, and the taxes and salaries must be paid, and the capital had increased in spite of all efforts. In conclusion, the Chairman moved the adoption of the report and accounts.

Mr. STEWART seconded the resolution.

Mr. WILSON thought the value of the stores should be stated.——Mr. STEWART said the return had not yet been received of the value of the stores.

Mr. WILSON went on to draw attention to the remuneration of the directors, and said that as far as regarded the remuneration of the directors for the years 1874 and 1875 was concerned, as it has never been entered in the accounts as a liability, he denied that the company was liable to pay the amount to the directors. He moved that the directors claim for remuneration for 1874 and 1875 be disallowed.——The Rev. W. H. SMITH seconded the resolution.

The CHAIRMAN said that although the directors had not taken their remuneration they never intended it for a moment to be supposed that they relinquished their claim to it, but it was always intended that the money should be paid when the company was a success. The directors did not intend to make any claim in cash, but they proposed to take the amount which had accrued in shares of the new company.

After some discussion the resolution of Mr. WILSON was put and rejected.

The resolution for the adoption of the report and accounts was then put and carried.

The subject of the directors' remuneration was again brought up, and after some further discussion the following resolution was moved by Mr. OSBORNE, seconded by Mr. STEWART, and carried:—"That the proposal of the directors to accept payment of their fees in the shares of the new company to the full amount be accepted."

The SOLICITOR then read the alteration proposed to be made in the Articles of Association of the newly constituted company, and the provision for the holding of meetings half-yearly in future was received with satisfaction. The borrowing power of the new company will be limited to 12,000*l.*

A vote of thanks was then recorded to Mr. Trotter, the manager, for the zeal and integrity with which he had managed the affairs of the company.

The CHAIRMAN, in putting the resolution, expressed the great confidence which the board had in Mr. Trotter, and said he hoped to see that gentleman managing the new company, in which case he was sure that everything possible would be done to promote the welfare of the company.

Mr. TROTTER acknowledged the compliment, and said he hoped the shareholders would subscribe to the debentures, and place him in working capital. He might mention that he himself intended to subscribe for some of the debentures, and, as he was in a position to judge of the value of the property, he thought this was a proof of the confidence he had in the company.

The meeting was then made special, for the purpose of confirming the resolution passed at the meeting held on Nov. 16:—

1.—That this company be wound-up voluntarily.

2.—That William Gimber Goodliffe, of 149, Palmerston Buildings, Old Broad-street, in the City of London, accountant, and Adam Steuart, of 19, Queen Victoria-street, in the City of London, be, and hereby are, appointed liquidators, and that their remuneration be fixed at the sum of 31*l.* 10s. each.

3.—That this company approve the scheme of re construction explained to the meeting—That a new company be incorporated for the purpose of taking over the business, assets, and liabilities of this company, in exchange for fully paid-up shares in the new company, the holders of preference or A shares in this company receiving shares in the new company in the proportion of three fully paid-up shares of the value of 1*l.* each in the new company for every preference or A share in this company, and the holders of deferred or B shares in this company receiving shares in the new company in the proportion of one fully paid-up share in the new company for every deferred or B share in this company, and that the liquidators be, and they are hereby, authorised to concur in the incorporation of a new company for the purpose of carrying that scheme, or any modification of it which may be approved by them, into effect, and that pursuant to section 161 of The Companies Act, 1862, the liquidators be authorised to transfer or sell the business and property of this company to such new company when incorporated, and to receive in compensation for such transfer or sale, fully paid-up shares in the capital of such new company, for the purpose of distribution amongst the members of this company, pursuant to the above-mentioned scheme.

4.—That the purchase money for the interest of any dissentient member be raised, wholly or in part, by a sale of the share or shares, which would otherwise be allotted to such member, or out of such funds, and by such means, as the liquidators and the new company may agree upon. The terms of settlement being in accordance with the 162nd clause of The Companies Act.

The resolution was put, and carried.

A vote of thanks to the Chairman and directors closed the proceedings.

For remainder of Meetings see to-day's Journal.]

THE COMBMARTIN SILVER-LEAD MINES.—On Monday a number of landowners in Combmartin dined together at the King's Arms Hotel, on the occasion of signing a lease for 21 years to the new lessees of the celebrated Combmartin Mines, by which arrangement the many spots of land between and around the property of Sir Charles Watson, lord of the manor, have become part of this extensive and undivided mining sett. After dinner the toast "Prosperity to Combmartin" was proposed and responded to by Mr. Joshua Harris, who, in the course of his remarks, gave some most interesting information as to how and why the district, which was admitted on all hand to be rich in mineral, had been allowed to remain idle so long. But many impediments, he said, which formerly existed had been removed—(hear, hear)—and he could assure the gentlemen who had thus far so successfully advanced in their operations that they would receive the hearty support and co-operation of the whole district. (Hear, hear.) He well remembered the dissatisfaction expressed at the abrupt closing of the old Combmartin Mine 29 years ago, at a time when large quantities of rich silver-lead ore were being taken out. Practical men had always been of opinion that if fully and fairly developed the resources of the district are unlimited, and any company acting fairly and honourably by the landowners, would find all ready and willing to render every assistance in their power. Mr. Clogg, jun., in proposing the health of the lessees, alluded to the conditions of the lease, which, on the whole, he considered satisfactory. He thanked the solicitor—Mr. James Lugdon—for the careful way that gentleman had protected their interests, and he felt quite sure that the name of Mr. F. Thomas was of itself a guarantee that practical ability, zeal, and energy would be brought to bear. Mr. F. Thomas, in responding, said that as all their interests were identical, there could be but one object in view—the prosperity of the mining operations of Combmartin; of this he had no fear. Many obstacles which had stood in the way of fair dezelopment of the district had been got rid of, and a railway direct to Combmartin would soon be an accomplished fact; and he need not tell them what advantage this would be to all concerned. He thanked them for the compliment paid him, and would assure them that with the aid of the gentlemen with whom he was associated no rational efforts would be lacking to revive the old prestige of the celebrated Combmartin Mines. Several other toasts were given, and a most satisfactory gathering brought to a close.

SOUTH CARADON MINE—PRESENTATION TO MR. KITTOW.—Mr Thomas Kittow who, after 40 years of valuable services to the adventurers of South Caradon Mine as their purser, has found it necessary, on account of his great age, to retire from the active duties of the position, has been presented with two costly testimonials, one by the shareholders, and the other by the workpeople employed on the mine, as a mark of the great esteem in which he is held by them and in recognition of the straitforward and honourable manner in which he has always conducted the financial affairs of the mine. South Caradon was started in the year 1836 when Mr. Kittow took the lease from a lady named Norris, and has held a very large interest in the concern, as well as other members of this family, from that time to the present. The mine was divided into 512 shares, and upon each share 25s. were called up, and since then the mine has paid in dividends no less a sum than 73*l.* per share, or equal to 374,272*l.*, in addition to which 100,000*l.* has been paid in dues. These facts were referred to with pride by some of the gentlemen who were present. The presentation of the testimonials took place at the house of Mr. Kittow, at Browda. It was mentioned that the last sale of copper ores from South Caradon realised 6990*l.*, whereas, the same quantity a few years ago would have brought 10,310*l.*, making all the difference between a 2*l.* and a 10*l.* dividend.

STOCK EXCHANGE YEAR BOOK.—The third annual edition—that for 1877—of Mr. THOMAS SKINNER's excellent little volume bearing this title has just been issued through Messrs. Cassell, Petter, and Galpin, of Ludgate Hill, and contains as usual a careful digest of information relating to the origin, history, and present position of each of the joint-stock companies and public securities known to the markets of the United Kingdom. The issue for 1876 comprised a list of public securities and companies about twice as long as that known to the London Stock Exchange, and upwards of 200 additions have since been made. Against this augmentation is to be set the mortality amongst companies formerly given. An unusually large number have fallen from the ranks during the past 12 months, but they were happily not of the first importance. The notices relating to the financial condition of the borrowing governments, of American railways, and such other undertakings as are just now being closely investigated by investors, have been carefully revised, and in many cases altogether rewritten in the light of the most recent authoritative information. Cost book mining companies are for the first time included, and Mr. Skinner explains that in response to numerous requests a beginning has been made with them, although the information concerning them is not ample, and is not easily obtained. It may be hoped that the particulars will be more readily given, as the collection of the whole of such facts in one volume must be equally advantageous to individual investors and to the companies themselves. The companies of which history and details are now given are classified as government stocks—home, colonial, and foreign, including municipal; railways—home, colonial, and foreign; banks; insurance, gas, and water; mines, including collieries; tramways, telegraphs, steamships, and miscellaneous. The facts are given in a form which renders them very easy to refer to, and in almost every case the information is sufficiently complete to enable the intending investor to form a pretty accurate opinion as to the desirability or otherwise of connecting himself with any particular undertaking. The work is one which should be in the office of every sharedealer and company manager, whilst to investors it will prove invaluable.

CRACROFT'S TRUSTEES' GUIDE.—Considering the almost inestimable responsibilities undertaken in accepting trusteeships, such a work as that of Mr. B. CRACROFT (London: the Author, Austinfriars) must be of great value to trustees, and the fact that it has reached its 12th edition may be accepted as evidence of its reliability. In the first part special and general directions of considerable value are given, whilst the second part contains a digest of reported decisions bearing on investments by trustees from the year 1743 to the present time—covering, therefore, 133 years. Here will be found, disentangled from all extraneous elements, the actual words of wills and deeds, and the actual investments decided upon by the Courts, with, in most cases, the words of the Judge, from the year 1743 to the present time. This digest professes to contain all the reported cases that are of any real service as guides to trustees, and wherever a case has been omitted, to have omitted it solely in order not to multiply reference to well settled points. The third part embraces lists of securities and comparative prices for a series of years. British Government securities and Indian Government securities are very fully referred to. The Colonial Government Loans are most elaborately analysed, giving the colony and description of the loan; the amount of loan in the hands of the public; rate of interest, when and where payable; details of sinking funds; drawing and final redemption; the amount of loan offered; date of issue; minimum price of tender, or issue price; through whom offered; amount, funds, and remarks. In addition, the foreign Government securities, from Argentine to Venezuelan, are treated in a similar manner. Then comes an analysis and summary of the United States Government securities, taken from the latest official sources, including bonds issued to the Pacific Railway Company. Under railways Mr. Cracroft gives British, British possessions, and India, ordinary, preference, and debenture stocks or shares, prefaced by the method and form of transfer, stamp duty, registration and fee, stock certificates, and payment of dividends, after which a surprising amount of information in the tabular form, facilitating reference with a minimum of labour and with exceptional clearness and beauty to typography is given. Thus, among other things, the half-yearly dividends are given from the year 1870 inclusive, and the highest and lowest prices from the year 1868 inclusive, with approximate yield per annum at the lowest price. The volume is really a reliable guide to investors, and will prove of the greatest value to them, whilst from the large amount of information which it contains it will prove very useful even to professional men.

CALVERT'S MECHANICS' ALMANAC.—The fourth annual edition of this almanac—that for 1877—has been issued, and really contains an immense mass of information upon a variety of subjects of great interest and importance to workmen, who will certainly derive far more than fourpence worth of knowledge from it. The penny sheet almanac by the same publisher (Heywood, Manchester) is also excellent.

THE SAN FRANCISCO MINT.—Since the first of the year $26,722,000 in gold have been coined, and $8,498,000 in silver, a substantial addition to the world's small change. The greater part of the coinage is, of course, double-eagles. For some time a strong demand for small gold has been shown, which has been aggravated by the heavy discount on silver.

I.X.L. AND EXCHEQUER.—The tongue and grooving and moulding machine for the Exchequer saw-mill has arrived at the mill, and will soon be in running order. These additions, with the Huntingdon shingle machine, now running successfully, will make this mill a well-appointed institution, and will be of great benefit to our citizens in the re-building of our town. Engineer Ward, of the Exchequer Mill, yesterday had the first joint of the middle finger of the right hand cut off by the engine. We learn that a body of rich ore has been struck in the I.X.L. Mine, but cannot give any particulars in this issue. By referring to an advertisement under "New To-Day," it will be seen that Manager Chalmers is prepared to let a contract to sink the I.X.L. shaft 200 ft. Bids will be received up to noon on Nov. 20.—Exchequer: The ledge in 400 ft. level continues to look well. Application of L. Chalmers for a license to collect tolls on Scandinavian toll road was laid over till next meeting of board of supervisors.—*Alpine Chronicle* (Nov. 11)

THE GOLD RUN.—A Bonanza: J. A Stone, superintendent of the Gold Run Hydraulic Mining Company (Limited), visited this place last week, and reports striking a bonanza in that mine. He exhibited to us $23 of coarse gold, the result of one pan of gravel taken from a powder drift they were then running, and that it was not any more than an average of richness of considerable ground they had prospected recently. Having with him also several large nuggets taken from a prospect shaft sunk 60 ft. from this powder drift, the gravel in which yielded $12 to the pan. They are busy at present putting in flumes, raising inclines, and running powder drifts, and will be ready to commence washing in three weeks if water can be had. Mr. Stone is confident that during the next year their company will pay the largest dividends ever received from any gravel mine in this part of the country, despite the dishonesty of the present administration, or even if Tilden should be elected.—*Dutch Flat Forum.*

## THE EXHAUSTION OF OUR COAL FIELDS.

More than 10 years have now elapsed since the appointment of the Royal Commission to enquire into the probable extent and duration of our coal fields. Upwards of five years have elapsed since the Commission issued its report, which was dated July, 27, 1871. These five years have witnessed the most remarkable changes in the coal trade of this country, changes which were not only quite unforeseen by the Commissioners, but which have to a large extent falsified their deductions and calculations. We do not know that it is possible, after the very minute and exhaustive enquiry of that Commission to throw much new light on the subject with which it was appointed to deal, but we may at any rate examine the present position of the question, and see how far the conclusions of the Commissioners have been modified by subsequent events.

When the Royal Commissioners issued their report on the extent and duration of the coal fields of this country they could not command later figures than those of 1869. In that year the total quantity of coal raised in Great Britain was 107,299,634 tons. Of that quantity, in round figures, 10,000,000 tons were exported, and 97,000,000 tons were retained for home consumption. It was calculated, on the basis of diminishing ratios, that the coal then contained in the coal fields of this country, which was calculated at 146,480,000,000 tons, would last for 360 years, and that at the end of 100 years from that date the annual consumption of our coal would be at the rate of 274,000,000 tons. Between 1855 and 1869 the production of coal in this country advanced from 64,000,000 to 107,000,000 tons, the average annual increase in the 14 years amounting to nearly 3 per cent. Prof. JEVONS calculated that a permanent increase of 3 per cent. per annum should be allowed in computing the duration of our coal supplies, but the Commissioners rightly pointed out that this view would in time lead to almost impossible quantities. It is, however, a matter of importance to note that the increase anticipated by Mr. JEVONS has not only been realised but exceeded during the period that has elapsed since the report of the Commissioners was issued. The increase of production between 1865 and 1869 was from 101,000,000 to 107,000,000 tons, but in the next three years the output of the country had advanced from the latter figures to 123,500,000 tons, so that while in the former three years the increment of production only reached a little over 6,000,000 tons, in the latter period it reached not less than 16,000,000 tons, and an average annual increase of 5,250,000 tons. This increase, although larger than that calculated by the Commissioners, is not exceptional.

In 1859 the quantity of coal raised in the United Kingdom was 6,500,000 tons in excess of the production of the previous year. In 1860, again, the production was 7,788,925 tons above that of 1859, and in the following year it was 5,000,000 tons above 1860, so that in these three years the production of coal in Great Britain had increased to the extent of more than 19,000,000 tons, being a larger increase than that of any limited period, whether before or since; and it is not a little curious that in the immediately previous three years—1856-58—the production of coal in Great Britain had only increased by 3,500,000 tons. From this it may fairly be argued that the augmented production of coal in this country is a thing of leaps and bounds—intermittent and irregular, and not steady and uniform; so that it is impossible to draw from the results of a few years any conclusions that could be safely and satisfactorily applied to the results of centuries. And this view, moreover, is corroborated by the fact that whereas between 1869 and 1872 the production of coal in Great Britain had increased by more than 16,000,000 tons, the increase in the following three years was not more than ten million tons, while it is not at all improbable that the present year will show an absolute decrease in the quantity of coal produced as compared with 1875. The experience of the past few years have, however, justified the conclusion that in the main the coal production of this country will continue to augment pretty nearly on the lines laid down by Mr. JEVONS, and if this conclusion continues to be borne out in the future we shall find that instead of a total estimated home consumption at the end of 100 years from 1871 of 274,200,000 tons—as calculated by Mr. PRICE WILLIAMS on the basis of diminishing ratios—the consumption at the end of the century would be 415,000,000 tons per annum, and instead of 360 years, the estimated quantity of coal available for use would only represent a consumption of 276 years. As distinct from the authorities we have mentioned, others have laid down the view that henceforth the population of the country, and the consumption of coal per head of the population, would remain constant, or merely oscillate without advancing, and it was calculated that in this case our available coal would represent a consumption of upwards of 1273 years, at the rate of 115,000,000 tons per annum; but the statistics of our coal production for the past six years have completely destroyed the value of any conclusions built on this improbable hypothesis.

The thing which has been shall be, and we may safely conclude that, whatever may be the ratio of increase, the coal production of this country will continue in the future to exhibit the same kind of accretion as it has done in the past. Nor would it be well for the interests of this country if it were otherwise. There is no finality about the British industrial. Stagnation, moreover, means retrogression; and the moment we cease to step forward we can hardly do otherwise than go back. England's interests are so closely bound up with her coal resources that the two things must be developed together, and if the latter is developed judiciously the former cannot suffer. But even if we take it for granted that instead of diminishing ratios the coal production of the future will be increased in a ratio not heretofore anticipated, there need be no fear of the consequences. "Sufficient unto the day is the evil thereof" if evil is impending, but if the past five years have proved anything at all in relation to our coal resources they have demonstrated that the actual extent, and therefore, the possible duration, of these resources are, after all, very problematical. Calculations of this kind are, at the best, matters of guess and conjecture. This has been abundantly proved by the estimates put forward by acknowledged authorities from time to time, not only as to the resources of Great Britain, but also as to the resources of other countries. For example, Mr. R. C. TAYLOR, in his "Statistics of Coal" (Chapman: 1850), and Prof. ANSTED in his "Elementary Course of Geology" (London: 1848), have calculated the coal area of the United States of America at 113,000 square miles, and of the British Islands at 12,000 square miles. Prof. ROGERS, again, has calculated the area of coal in the United States at 196,650 square miles, while he only puts down the coal area of Great Britain at 5400 square miles. A more recent calculation than either of these has placed the coal area of America at 192,000 square miles, and of Great Britain at 10,000 square miles. There is evidently hopeless conflict between these estimates, tending to render all conjecture as to the extent of our coal resources too speculative and problematical to be of solid value. And it is important to observe, in this connection, that although the Royal Commissioners calculated the probable quantity of coal contained in the ascertained coal fields of the kingdom at 92,207,000,000 of tons, and the quantity of coal which probably exists at workable depths under the Permian, New Red Sandstone, and other superincumbent strata in the United Kingdom at 56,273,000,000 tons, discoveries have been made since the report of the Commission was issued which will more or less modify these figures. As a matter of fact it is quite impossible to determine how far the coal resources of this country will actually go, except in so far as they are bounded by geographical possibilities. Every now and again fresh coal fields and sections of coal fields are coming to light. The last three or four years have very materially aided our knowledge on this subject. Coal has been found in many places and under many circumstances which have altered the previously existing conditions and calculations in a material degree. In proof of this we need only refer to the discoveries made in the North of Scotland by the Duke of SUTHERLAND; to the field of coal lately proved near Barnsley by the Barrow Hematite Iron and Coal Company; to the recent discoveries of coal in Staffordshire and Shropshire; and to the various smaller discoveries made in outlying districts, all tending to establish the conclusion that not only may there be more coal than the Commissioners calculated in the ascertained coal fields, but that beyond the coal fields actually ascertained of a not inconsiderable extent which it will be for the future to bring to light.

One of the most notable phases of the coal question is that of the gradual increase in the quantity of coal consumed per head of the population. In 1855 the population of this country was 21,792,872, and the quantity of coal raised was 64,307,459 tons, of which 59,330,557 tons were retained for home consumption, making the total quantity of coal consumed in relation to each head of the population 2 tons 14 cwts., but in 1869 the consumption of coal per head of the population had increased to 3 tons 17 cwts. 1 qr. 19 lbs., the consumption having very steadily crept up to the latter average during the intervening period. But in the estimated duration of coal on the basis of diminishing ratios, adopted by Mr. PRICE WILLIAMS, and embodied in the report of the Royal Commission, there is no adequate provision made for the increased consumption, it being assumed that in the year 1941 the average consumption of coal per head will reach only 4·6516 tons, and that it will remain at this figure until the exhaustion of our coal supplies has eventually been reached in the year 2231. But this assumption is not at all justified by the facts. The consumption of coal per head of the population has already exceeded 4 tons, and although the experience of the coal famine was expected to exercise a salutary influence in the way of reducing the waste of coal, and bringing increased economy into every branch of consumption, the extraordinary glut of the coal markets that has supervened, owing to the depression of the last two years, is only too likely to cause the lessons of the coal famine to be forgotten, or at any rate overlooked. One thing is very certain in the midst of so much uncertainty, and that is that if the increased consumption of coal per head of the population continues in the future to realise the experience of the past we shall reach the exhaustion of our ascertained coal supplies much sooner than the truest friends of England's industrial supremacy could desire; and, therefore, it is desirable, in the interests of the present as well as of the future, that there should be the least possible amount of waste.

## THE COAL TRADE.

Mr. J. R. Scott, the Registrar of the London Coal Market, has published the following statistics of imports of coal into the port and district of London, by sea, railway, and canal, during November, 1876:—

IMPORTS.

| By sea. | Ships. | Tons. |
|---|---|---|
| Newcastle | 209 | 176,572 |
| Seaham | 19 | 8,305 |
| Sunderland | 120 | 87,310 |
| Middlesborough | 6 | 1,919 |
| Hartlepool | 97 | 32,883 |
| Scotch | 16 | 5,416 |
| Welsh | 7 | 1,891 |
| Yorkshire | 33 | 3,893 |
| Duff | 2 | 781 |
| Small coal & cinders. | 19 | 3,384 |
| Total | 528 | 322,364 |
| Imports—Nov. 1875.. | 515 | 304,026 |

| By Railway and Canal. | Tons | c. |
|---|---|---|
| London & North-Western... | 133,624 | 2 |
| Great Northern | 80,790 | 0 |
| Great Western | 67,205 | 0 |
| Midland | 151,478 | 0 |
| Great Eastern | 73,615 | 9 |
| South-Western | 2,414 | 11 |
| London, Chatham, & Dover. | 12 | 0 |
| South-Eastern | 1,084 | 6 |
| Grand Junction Canal | 396 | 0 |
| Total | 510,619 | 8 |
| Imports during Nov. 1875 ... | 492,730 | 1 |

*Comparative Statement*, 1875 *and* 1876.

| By Sea. | Ships. | Tons. |
|---|---|---|
| Jan. 1 to Nov. 30, 1876. | 5121 | 2,975,333 |
| Jan. 1 to Nov. 30, 1875. | 5080 | 2,844,646 |
| Increase—present year | 41 | 130,687 |

| By Railway and Canal. | Tons. |
|---|---|
| Jan. 1 to Nov. 30, 1876 | 4,759,826 |
| Jan. 1 to Nov. 30, 1875 | 4,550,085 |
| Increase in the present year... | 209,741 |

Mr. Scott has also published an export list, showing the distribution of coal imported into the port or district of London by sea, rail, and canal, and afterwards exported coastwise or to foreign parts, or sent beyond limits of London district by rail or inland navigation, during November, 1876:—

EXPORTS.

| | | |
|---|---|---|
| Railway-borne coal passing "in transitu" through district..Tons | | 88,405 |
| Sea-borne coal exported to British possessions, or to foreign parts, or to the coast | 48,004 | |
| Ditto, sent beyond limits by railway | 11,647 | |
| Ditto, by canal and inland navigation | 2,517= | 62,163 |
| Railway-borne coal exported to British possessions, or to foreign parts, or the coast | 33,345 | |
| Ditto, by rail beyond district | 24 | |
| Ditto, by canal and inland navigation | 116= | 36,485 |
| Sea-borne coal brought into port and exported in same ships | | 1,619 |
| Total quantity of coal conveyed beyond limits of coal duty district during November, 1876 | | 188,677 |
| Ditto, November, 1875 | | 177,373 |

*Comparative Statement*, 1875 and 1876.

| | |
|---|---|
| Total distribution of coal from Jan. 1 to Nov. 30, 1876 | 1,768,195 |
| Total distribution of coal from Jan. 1 to Nov. 30, 1875 | 1,643,676 |
| Increase in the present year | 124,519 |

*General Statement*, 1875 *and* 1876.

| | | |
|---|---|---|
| Increase in coals imported by sea during the present year | 130,687 | |
| Increase in ditto by railway | 209,741 = | 340,428 |
| Deduct increase in coals exported | | 124,519 |
| Total increase in trade within London district during present year | | 215,909 |

## FOREIGN MINING AND METALLURGY.

The French iron trade is still dull, and one can but lament the general aspect of affairs. It is indifferent prices which especially tend to make the situation bad and discouraging. Thus the Northern of France Railway Company has ordered 46,000 tons of steel rails from the Denain, the Creusot, tho Terrenoire, the Montgolfier, and the Châtillon and Commentry Works, at 9*l.* 16s. per ton. An order has been accepted by the Creusot Works from the Orleans Railway Company at 9*l.* 7s. 2d. per ton. At a recent adjudication at Toulon for plates, required for the French Navy, the lowest tender delivered was that submitted by MM. Révollier and Biétrix, of St. Etienne, at 6*l.* 14s. per ton. In small transactions the price of iron has not varied during the last few days. In the Paris warehouses previous rates have also been generally maintained. Refining pig has been dealt in at 2*l.* 8s. 10d. to 2*l.* 10s. 6d. per ton in the Nancy group. In the Grand Duchy of Luxembourg a reduction in the production is still being aimed at. The Epinac Collieries and Railway Company commenced the payment on Monday of a dividend for 1875-76 at the rate of 5*l.* per share.

Comparatively little business has been passing in the Belgian iron trade. The slackening in affairs appears to be becoming more decided day by day, even for iron for building purposes and girders, which had hitherto afforded some support to otherwise languishing markets. Belgian ironmasters hope to find next year a somewhat important outlet for their products in Germany. The Federal Council has not yet announced its decision as to the abolition of import duties, but this decision is expected to be favourable to Belgian industrials. A royal Belgian decree authorises the Marais Iron Company, carrying on business at Montigny-sur-Sambre, to establish four new puddling furnaces, a re-heating furnace, two rolling-mill trains, three steam-engines (one of 80-horse power), &c. These extensions were proposed in January of this year, when there were hopes of a revival in affairs. It is doubtful whether they will now be carried out. A contract has been let this week at Buda Pesth for 4450 tons of Bessemer steel rails for the Hungarian State Railways. Another contract for 4527 tons of steel rails for the Moselle Railway is about to be let at Sarrebruck.

The advices received with respect to the French coal trade are far from favourable. In the Nord and the Pas-de-Calais the demand is considerably reduced, and stocks are accumulating rather than otherwise. The slackening noticed in the demand is attributed to the unfavourable state of the beetroot sugar manufacture, and also, to some extent, to the mildness of the season. Of these two influences the first is much the most serious; the number of sugarworks idle is, indeed, daily increasing, and while coal has began to decline in price, sugar is hardening in value. The downward tendency noticed in prices will probably become more decided if the weather continues mild. The basin of the Loire has not suffered, like the Nord, from the depression in the sugar trade; in the Loire district, indeed, prices have been maintained with tolerable firmness, and deliveries have been fairly active. The metallurgical interest of the Loire district has also received some orders of considerable importance, and these orders will maintain a fair amount of activity in the local demand for coal.

At Paris, Chilian copper in bars has made 82*l.* per ton; ditto, ordinary descriptions, 80*l.* 10s.; ditto in ingots, 82*l.*; English tough cake, 85*l.*; English best selected, 86*l.*; and pure Corocoro minerals, 81*l.* per ton. The last public sale of tin by the Dutch Society of Commerce comprised 29,611 ingots of Banca, and 3510 ingots of Billiton. The average price realised was 46·60 fl. for Banca, and 45¾ fl. for Billiton. Lead has been firm, and there is an impression that quotations will advance. At Marseilles, Vieille-Montagne zinc in sheets has been brought 30*l.* 8s. per ton.

The Belgian coal trade remains in much the same condition. The tendency is rather to contract deliveries, the sugar works having completed their supplies for the season. Prices cannot well go lower at present, but they remain where they were without the least chance of improvement. Producers appear disposed to seek for some compensation by selling their coal to private individuals upon terms which often indicate a difference of 25 per cent., or even 30 per cent., when compared with those which industrials obtain for the same qualities. It is, of course, natural that the consumer who purchases a single truckful of 10 tons should pay a higher price for his coal than that paid by a purchaser of several hundred tons, but the difference should not be so marked as that which has been just reported. The desirability of improving coal trucks upon the Belgian railways has been recently suggested. Trucks made of steel plates are proposed, as presenting the minimum amount of dead weight with the maximum carrying capacity.

THE UTILISING OF COAL DUST.—Some of the English visitors to the Philadelphia Exhibition have had their attention directed to a number of novel inventions brought out by our ingenious friends. Not the least interesting of these was an invention for utilising coal dust, as shown to Mr. Walter, of the Times, while visiting some works at Bethlehem. It appears that Mr. Walter was greatly interested in the invention, which is patented by a Mr. Wooten, and expressed a hope that it would be introduced into Europe. There is no apparent reason why coal dust should not be converted into fuel, and several patents have been taken out in England for the purpose, but scarcely one of them have been worked to any extent. That there is a vast field open for such an invention will be readily admitted by all persons at all conversant with mining operations in this country. What to do with our coal dust has been a problem which our colliery owners have long been desirous of seeing satisfactorily settled. At present it is all but useless, not only the dust but some of the small coal that is known as smudge, and which in some districts at the present time only realises from 1s. to 1s. 6d. per ton. In some seams of coal the miner in cutting makes from 30 to 35 per cent. of small, for some of which there is the greatest difficulty in finding markets, without making any profit whatever, but very often a decided loss. Now, if some of this coal can be so manufactured as to be made solid, and so used for household and general purposes it would be a great boon to our colliery owners, and would also benefit the public as well, for it could not fail to keep down the price of coal to a reasonable limit. We hope to hear of the invention being brought under the notice of the proprietors of coal mines in this country, seeing that it is what has long been required for making profitable that which has hitherto been useless.

COTTON POWDER.—Some interesting experiments for testing the strength of the explosive manufactured by the Cotton Powder Company, of Oare, near Faversham, were recently made on Pevensey levels, near Eastbourne, before the Committee on Siege Operations, by Mr. S. J. Mackie, C.E., the general superintendent of the company's works. Shells of 6¼ in., 8 in., and 10 in. respectively were filled, one set with the cotton powder and the corresponding set with the service (Abel's) guncotton. The cotton powder employed was identically the same as is ordinarily and extensively used for mining, tunnelling, quarrying, and submarine operations. The relative closeness to which the two explosives can be packed may be judged of by the fact that a 6¼-inch shell would contain but 4½ lbs. of the service cotton, whilst 7 lbs. of the cotton powder was got into into it; similarly the 8-in. shell would take but 10 lbs. of service cotton against 14 lbs. of cotton powder; and the 10-inch shell took 21 lbs. of service cotton against 24 lbs. of cotton powder. It will, of course, be understood that for mining purposes the greater weight of an explosive, the explosive force per pound being the same, which can be got within a given space the larger will be the burden of rock removed. The six shells being charged were laid on the roof of the target, casemates having thicknesses suitable for testing the action of the various charges. The whole were fired together by electricity with the service (Abel's) fuzes and detonators. The only shell which penetrated the solid roof was the 350 pounder 10-in. shell with its bursting charge of 24 lbs. of cotton powder, the explosion of which made a crater on the upper surface of the roof of 6 ft. diameter, and an inverted crater on the under surface or ceiling of the interior casemate of 5 ft. 9 in. diameter, there being complete perforation where the two craters intersected. The construction of the roof at the place broken through was a lower arch or vaulting of the casemate 14 ft. in span, consisting of 18 inches of brickwork, over which was a thickness of 2 ft. 6 in. of flint shingle concrete, well set. The result of these experiments may be regarded as conclusive with regard to the great value of the cotton powder for mining purposes; it is handled precisely like ordinary blasting powder, yet developes a force considerably exceeding that of the best guncotton.

HYDRUALIC PROPULSION OF TRAMWAY CARS.—About midway on a line or network of tramways, or at any other point of the same line, a motive-power engine is, according to the invention of Mr. L. ROUSSEAU, C.E., of Brussels, mounted and arranged in combination with pumps and apparatus in a similar manner to those employed in ports, docks, or warehouses, where the lifting apparatus are actuated by hydraulic pressure. For this purpose a pipe or tube for conducting water under pressure is laid down along the whole of the line of tramway or its branches, and in communication with a reservoir or receiver. At suitable distances apart valves or taps are placed in the said pipe or tube in order to supply water under pressure to the carriages of the train, which are placed at certain stations in communication with the reservoir or receiver above mentioned. At these different points or stations each carriage completes or renews and stores away the necessary quantity of water under pressure which is required to enable it to act automatically in the distance comprised between two hydrants for taking in the water. In order to maintain the water under pressure stored in each carriage, a receiver is fixed either horizontally or vertically under the floor of the carriage. This receiver is composed of one or more cylindrical metallic vessels containing compressed air at high-pressure (from 20 to 30 atmospheres), according to the power required. The compressed air contained in each receiver acts by its elasticity similar to a spring, either direct or by means of a piston, on the water supply contained also in one or more cylindrical vessels. The water under pressure in the reservoirs or receivers puts in motion the mechanism, and thereby gives rotary movement to the wheels of the carriage. In order to put the mechanism in motion, an ordinary hydraulic capstan is employed, or the well-known multiple cylinder apparatus of Brotherhood or West, or the well-known cyclo-dynamic machines of Mathon, or any other suitable mechanism, in order to obtain the same result.

CORNISH PUMPING ENGINES.—The number of pumping-engines reported for October is 17. They have consumed 1930 tons of coal, and lifted 14,100,000 tons of water 10 fms. high. The average duty of the whole is, therefore, 48,900,000 lbs., lifted 1 ft. high, by the consumption of 112 lbs. of coal. The following engines have exceeded the average duty:—

| | | |
|---|---|---|
| Botallack—30 in. | Millions | 52·1 |
| Dolcoath—85 in. | | 54·7 |
| Mellanear—76 in. | | 52·2 |
| West Tolgus—Richard's 70 in. | | 60·9 |
| ditto —Taylor's 60 in. | | 53·8 |
| West Wheal Seton—Harvey's 85 in. | | 65·2 |
| Ditto —Rule's 70 in. | | 54·8 |
| Wheal Unity Wood—70 in. | | 61·7 |

## MINERS' SAFETY CAGES.

The mechanical apparatus forming the subject of the invention of Mr. THOMAS DOBSON, of Kingston-upon-Hull, is intended to be applied to miners' cages, hoisting frames, and such like apparatus, or to be interposed between the lower end of the winding rope and the cage or framework, and such apparatus is called into action upon the breakage of the rope or its connections. The apparatus consists in a metal framework and apparatus in which several lever arms, hinged at the one end of each, and radiating from a common centre, are jointed at their inner end to a central sliding piece or sleeve, which in turn is framed together and supported by a metallic strap or sling, which in turn is connected to the hoisting rope or chain. The central sliding piece or sleeve is guided vertically on a vertical pin or bar, having a spiral or other spring interposed between it and a cap or button head securely attached to the head of the stud. At the outer extremity of each radial arm is hinged a claw plate or other suitably shaped roughened surface, for taking into, clipping, or gripping or expanding against the vertical guides in the pit or lift when the strain due to the weight of the cage and its contents becomes suddenly removed or disconnected from the supporting rope or chain.

Each of the radiating arms is hinged or jointed by a short connecting bar or rod to a cross boss or reed sleeve, so that when the cage, box, framework, or other form of apparatus or contrivance is freely suspended the weight thereof acts against the spring and holds it in compression, and contracts the radial lever arms (through or by means of the pull on the short connecting bars or levers) into close proximity, but upon the weight or load being disconnected or severed from the supporting rope or chain, the arms are caused to expand uniformly and to come in contact with and take their thrust against the vertical guides, and so to arrest the further downward progress or motion of the cage or frame, box, or platform. The central rod sliding through the upper sliding sleeve is at its lower end connected to the cage, whilst the inner ends of the expanding arms are through or by means of the loop or sling connected with the rope or chain. Upon the rope or chain breaking, the inner ends of the jointed radial arms or levers are by the joint action of the spring and the freeing of the sliding sleeve and its attachment caused to approach the lower cross boss, and so to throw out or expand the radial arms.

## MANUFACTURE OF IRON AND STEEL.

The production and application of cyanide of ammonium in blast-furnaces, Siemens-Martin furnaces, Bessemer converters, puddling-furnaces, and the like for removing phosphorus and sulphur from iron and steel during manufacture has been suggested by M. SIEGFRIED STEIN, of Bonn, Prussia. In blast-furnaces the cyanide of ammonium is produced by mixing with the charges of ore, coal, coke, and limestone a certain proportion of titanic iron ore, carbonate of potash, or any suitable compound of potassium, either separately or combined, while at the same time, at a suitable height above the tuyeres a jet or jets of steam, carburetted hydrogen, petroleum vapour, or other hydro-carbon, either separately or combined, and by preference at a high temperature, are forced into the furnace. In practice he prefers to mix the titanic iron ore which is mostly found in a state of fine sand, in the proper proportion with the crude coal before coking the same in the ordinary way, so as to have the ore in most intimate mixture in the coke. If carbonate of potash is used he prefers dissolving the necessary quantity in water, thus forming a solution which the coke is made to absorb, being dried afterwards before use. In both cases the coke so prepared is charged in the ordinary manner along with the impure iron ore, limestone, and the like at the top of the furnace. It is not necessary that all the coke used should be prepared as above, it is sufficient if only a portion of the coke required for the furnace is so prepared, always provided that the quantity of titanic ore, or carbonate of potash, or of both combined, necessary for the purification of the impure materials used in smelting is regularly added to each charge. The quantity of titanic ore or carbonate of potash required will depend entirely on the quantity of phosphorus and sulphur to be eliminated, and the correct proportion must be ascertained by actual experiment, but as a guide to those using this invention it may be stated that in practise about 10 lbs. of carbonate of potash, or a proportionate quantity of titanic iron ore, will be required for every 1 per cent. of sulphur and phosphorus and per ton of iron made.

For forcing the superheated steam or hydro-carbon into the furnace he prefers to arrange a second tier of smaller tuyeres above the blast tuyeres, at such a height where all the oxygen contained in the atmospheric air of the blast has been practically consumed, and reduction of the ore by the action of the carbonic oxide has commenced. The proper height he ascertains practically by inserting bars of wrought-iron for a short time through the tuyere box at different angles into the furnace, and placing the steam tuyeres a little above the line where the iron bars begin to burn away. In practice this height varies a good deal according to the quantity and pressure of the blast, but 12 in. to 18 in. above the centre of the blast tuyeres will be found in all ordinary cases the proper height for the steam tuyeres. In using superheated steam alone it will be found sufficient to take the steam direct from the boiler, passing it through a series of pipes heated by part of the waste gases similar to those used for heating the blast, but if hydro-carbons are to be mixed with the superheated steam (which he prefers doing) a modification of the steam-blower can be advantageously employed for taking up the vapour of the hydro-carbons that are to be mixed with the steam.

By adding titanic ore or carbonate of potash to the charge, cyanide of titanium or cyanide of potassium are produced as soon as the charges reach the reception basin in the furnace, while the superheated steam and hydro-carbons meeting the nitrogen and carbonic oxide of the reducing zone produce compounds of ammonium (probably carbonates) which meeting the cyanides above mentioned in *statu nascendi* form cyanide of ammonium in the very zone of the furnace most suitable for the elimination of phosphorus and sulphur from the materials used in smelting iron by the action of cyanide of ammonium, and experience has proved that the phosphorus and sulphur thus eliminated do not recombine with the cooler portions of the charges above, but escape in the form of gases (the nature of which has not been as yet fully ascertained), burning away at the mouth of the furnace, or are consumed under the boilers or other apparatus heated by the waste gases of the furnace. Applied to Siemens-Martin furnaces, Bessemer converters, and puddling-furnaces, the cyanide of ammonium is produced and applied by introducing at the proper period into the molten metal a mixture of sal-ammoniac, and dried yellow prussiate of potash, or any other suitable compound that gives off cyanide of ammonium at a high temperature, To carry out this part of the invention he uses a mixture of three parts of dried yellow prussiate of potash and two parts of sal-ammoniac in a finely-powdered state, or if Berlin blue or Turnbull's blue is preferred, he uses two parts of either of these to one part of sal-ammoniac at the rate of about 5 lbs. to 6 lbs. of the mixture for every 1 per cent. of phosphorus and sulphur per ton of iron or steel. In the Siemens-Martin furnace he prefers to introduce the necessary quantity of any of the above mixtures in small doses immediately before a fresh quantity of iron is added to the bath in the furnace, but it can also be added in larger doses just before the final heating of the bath before tapping the metal.

For the Bessemer process he prefers to employ a closed hopper large enough to contain the required quantity for one charge of any of the above mixtures, and communicating with the blast pipe as near to the converter as can be conveniently arranged by a suitable stop-cock, by turning which a portion of the mixture is dropped at each revolution into the blast pipe, and is carried by the blast through the tuyeres into the metal. A small quantity of charcoal dust may be usefully mixed with the compound to prevent caking, and to facilitate the carrying of the powdered materials by the blast through the tuyeres into the molten metal. A flat bar of iron placed in a slanting direction across the centre of the tuyere box will also be found useful in causing a rotary motion of the blast in the box, thus sweeping up any particles of the mixture that may have settled there.

In the application of the invention to the Bessemer converter the cyanide of ammonium in a gaseous form may also be introduced directly into the blast, but in this case care must be taken that the whole of the apparatus is thoroughly air-tight, and provision must be made to ensure that any escaping gas shall be carried away by the draught up the chimney, where it it is burned in passing the mouth of the converter. In the puddling-furnace any of the above mixtures are introduced as soon as the iron is melted, and as the quantity required is only small he prefers to use a shallow wrought-iron trough with a a long handle which can be easily introduced into the hole in the furnace door. The mixture is put into the trough, the latter is introduced at the said hole in the furnace door, inverted with a sharp jerk, and moved about in the molten iron in all directions, the gas escaping all round the edges of the said trough and passing through the iron. When the escape of gas ceases the handle is depressed, the residue removed from the trough by a smart blow against the handle, and after cooling the trough in water the operation can be repeated if the iron requires a second operation to free it sufficiently from phosphorus and sulphur.

## TREATMENT OF METALLIC ORES.

Some important improvements in the treatment of auriferous ores have been invented by Mr. CHARLES WRIGHT, of Gresham House, Old Broad-street. His improved machine is constructed with a bed and casing similar to those of ordinary iron rotating pans, and it has arms and carriers geared and driven from underneath by a pulley on a horizontal shaft; there is a hopper whereby the ore is fed into the machine below the water on the bed. The bed is nearly level from the centre to the ridge or rim on the edge of the outside groove or channel, and retains all material treated of greater specific gravity than 2·5, or thereabouts. When this accumulation of concentrated matter rises to the height of the said ridge or rim, the machine must be stopped and cleaned up, an operation readily and quickly performed. The vertical driving shaft passes up through a long boss or bushing in the centre of the bed, and upon the top of this shaft is fitted a hub to which the arms are attached, these arms have two series of carriers fitted and adjusted to their lower side, the carriers of the series graze the bed, and are curved and set to give a drawing motion towards the centre of the machine to all particles of ore which gravitate to the bed. The carriers of the other series are curved and set reversely to the other carriers, and have precisely the opposite effect upon all lighter material in suspension, as these carriers do not touch the bed. By this arrangement of the carriers, therefore, a double current of the particles is produced, the upper current carrying off the slimes towards the curb, and the lower one drawing heavy and solid particles from the curb inward; in this respect, therefore, the carriers serve as self-acting riffle bars. The groove or channel at the circumference of the machine has openings into hoppers below, and is traversed by scrapers on the ends of the arms to clear it of coarse light material, such as unground quartz, which finds its way over the ridge, and is consequently collected and re-ground in any suitable pulveriser. The discharge openings for the slimes are so arranged below the surface of the water as to permit all float gold to remain undisturbed by the discharging streams, and to allow of the employment of various expedients to secure it. A spray of clear water playing upon the surface will throw down the greater portion after a time, and if sodium amalgam is judiciously used just before drawing off the contents to clean up little, if any, need be lost.

Considering that in actual milling the best authorites estimate the unavoidable loss of float, flour, and impalpably fine gold at present to be fully one-third (and often two-thirds) of the assay of the ores treated, it is of the greatest importance to mining companies to stop this enormous waste. In some instances the native gold is so extremely fine that the slightest breath is sufficient to blow it away, its excessive lamination giving its minutest particles so much surface to be exposed, that it has been found impossible with the best amalgamating contrivances hitherto known (using a current of water) to pay the expenses of working sands which by assay should have yielded enormous profits. The improved machine concentrates closely and rapidly in water without a current, and is especially designed to effect the saving of float gold, a saving at present only possible by the employment of sluices extending a great distance, and extensive slime pits. Convenience and security are obtained by having the mill tailings exhausted within the building, and there is also great economy in this arrangement, as the further the particles of gold are carried the finer and more difficult to save they become, while the first cost of long series of sluices, slime pits, and other appliances, and the necessary repairing and attendance, greatly detract from the value of tailings which are but imperfectly treated at last.

The frequency of the cleaning up is dependent upon the percentage of sulphurets or other heavy substances contained in the ores treated. When the machine is used solely for gold concentration or amalgamation it does not absolutely need cleaning more frequently than once a week, and may in the meantime be locked, as no attention is needed to its interior, nor can any amalgam escape so long as the machine is kept in proper motion. The slimes from the upper discharging points being of no value are discharged as waste. In treating gold ores, gold amalgam and sulphurets will be found ranged upon the bed of the machine at the centre and relative distances therefrom in the exact order of their various specific gravities.

ARTIFICIAL FUEL.—The invention of Mr. F. J. HAMEL, of Avenue-road, is an improvement upon his patents of 1872 and 1876. In order that the mineral and vegetable pitch, resin, and resinous matters, and other such like materials used in making artificial fuel shall be effectually brought to the soluble consistency required he proposes by this patent to do so by means of water pipes or other vessels containing water, which shall be placed in a cistern or tank, which pipes or vessels shall be heated and kept in a heated state by means of a furnace with which the pipes or other vessels are connected, and by which heat will be engendered and circulated.

GENERATING AND APPLYING ELECTRICITY.—The inventioo of Mr. I. L. PULVERMACHER, of Regent-street, consists in employing carbon vessels of a certain porosity and of various shapes,; for instance, flat or cylindrical. In the hollow of these vessels he places bar or hollow cylinder of zinc in such a manner as to prevent a contact with the carbon vessel. The space between the zinc and the carbon vessel is filled with pulverised salt of ammonia, or a substitution of any other salt of an analogous action, which when slightly moistened with water, so as not to dissolve, excites the galvanic element thus formed. When the circle of such an element is closed an electric current of a constant action is produced by the atmospheric oxygen absorbed by the porous carbon vessel. The oxygen in presence of the salt of ammonia depolarises the carbon, and thus secures a constant current. Such elements he uses for making stationary as well as chain batteries, and he establishes voltaic connections among such elements accordingly.

WALRUS-HIDE MACHINE BELTING.—The specimen of gigantic machine belting which has recently attracted so much attention at the Leeds Corn Exchange, is manufactured by Mr. JOSEPH MARCH, of that place, the material used being the skin of the walrus or sea horse. It is stated that this belting cannot be equalled by any yet introduced for strength and durability for heavy work when used upon large drums such as main driving. The thickness of the walrus hide is from ¼ in. to 1¼ in., so that belts of that substance can be made of all solid leather, and the fibres thereof being longer than any other hide used in strap making, it is remarkably tough and lasting. There are walrus hide belts in this country which are still running, and which have been in constant use as main driving belts in forges, saw mills, and other large works for 15, 18, and 20 years, yet they are in good running order, and giving the utmost satisfaction. It is frequently observed that in ordinary double belting a great strain takes place on the outside lap of the belt, which, of course, cannot be the case with the walrus hide belt, owing to its being of one thickness only. It is remarked, moreover, that they run very slack, and do not require to be worked tight as some belts do; indeed, the bight on the drum is marvellous. For example, a 14-in. belt 90 ft. long will drive 100-horse power with great ease. Mr. March is now having six 18-in. belts finished for a firm for main driving; they are made in lengths of from 6 ft. to 9 ft., the joints being cemented and put under great pressure for 48 hours, and then sewn with ½ in. laces ⅛ in. thick, and riveted with extra strong copper rivets, and the last joint when in use is made with steel plates and bolts. The price is lower than that of the best double belting, and the great drawback is that walrus hides are now and then very scarce and high in price; four years ago they were 5s. 6d. to 6s. per lb. in the rough, but there is now a better supply of them, though how long this will last cannot be determined.

MOULDING ARTIFICIAL STONE.—A series of ingenious apparatus has been invented by Mr. J. C. SELLARS, manufacturing chemist, of Birkenhead, for moulding into various forms artificial stone when in a semi-plastic condition for the production of hollow blocks, slabs, linings, jointings and other shapes in stone employed in building. Apparatus or appliances constructed under this invention consist essentially of a stationary mould or container for holding the material to be moulded, and a plunger operated by a screw or other suitable means for compressing and solidifying the loose or semi-plastic material constructed and operating in any ordinary or convenient manner.

CRUSHING ROCK.—Stone crushers, as at present constructed, are considered by Mr. R. GARDNER, of Liverpool, to be complicated and cumbrous; he has, therefore, designed certain improvements with a view to make a machine as simple, strong, and compact as possible, combining in the same machine either crushing or breaking. In carrying the invention into practice he makes a very strong iron or steel box or frame, usually forming a parallel sided rectangular chamber without top or bottom. Horizontally through two opposite walls of this through bosses, cast sufficiently strong to form bearings, he bores a hole large enough to insert the bearings of the shaft. This shaft is turned eccentric in the middle portion and larger in diameter than at the journals, and the bearings are slid in from the outside after the shaft has been placed in position and secured with set screws, keys, or other fastenings. In the rectangular chamber, and extending entirely across it, is a movable jaw. This is hinged on the shaft, the eccentric portion passing through it in a hole bored for the purpose, and usually lined with brass. The movable jaw and the side of the rectangulor chamber facing it which forms the stationary jaw can be fluted or have projections on indentations cast thereon in any desirable manner. He usually makes these wearing surfaces of separate very strong forgings, or malleable castings of iron or steel, so as to be replaced when worn. The back of the jaw and the side of the rectangular chamber facing it are grooved with a series of horizontal grooves. A stout distance piece or strut of iron or steel has each of its ends so shaped as to fit into one of these grooves. The mode of working is very simple. The shaft being rotated by a strap, or in any convenient manner, the eccentric gives both a vertical and horizontal movement to the top of the jaw, and in front of the distance piece a varying motion depending upon the length and angle of the strut, and direction of rotation. The stuff to be crushed being inserted between the two jaws by means of a hopper or otherwise, the working of the movable one breaks or grinds the stuff against the stationary jaw. This apparatus will be found applicable to the crushing of slag, chemicals, and other substances as well as rock.


# COAL-CUTTING MACHINERY.

**W. and S. FIRTH undertake to CUT, economically, the hardest CANNEL, ANTHRACITE, SHALE, or ORDINARY COAL, ANY DEPTH, UP TO FIVE FEET.**

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TRACTION ENGINES.
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CIRCULAR SAWS.
CORN MILLS, &c., &c.

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# PATENT IMPROVED ORE WASHING & DRESSING MACHINES.

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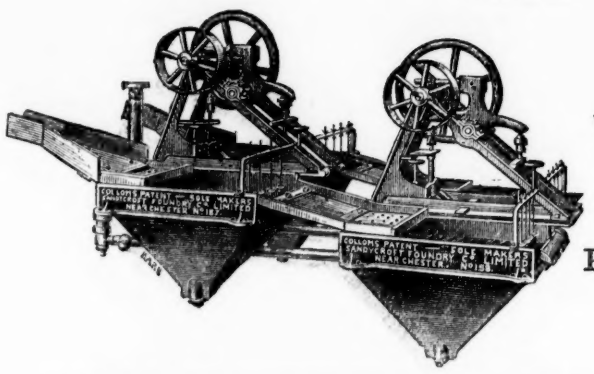
LATE THE MOLD FOUNDRY CO. (ESTABLISHED 1838).

SOLE MAKERS IN GREAT BRITAIN.



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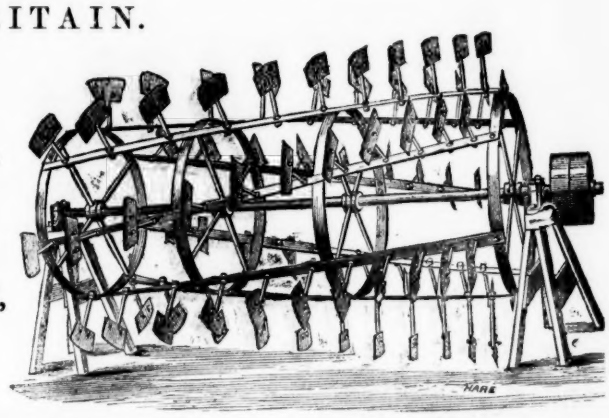
OF PECULIARLY HARD AND TOUGH MIXTURE

&c., &c.



COLLOM'S PATENT AUTOMATIC ORE WASHING MACHINE, working at the following and many other Lead, Copper, Blende, and Tin Mines:—Great Laxey, Cape Copper, Pontgibaud, Linares, Alamillos, West Tolgus, Lisburne, Minera Halvans, Snailbeach, &c.; and also at Messrs. Vivian and Sons' Works, Swansea.

PATENT IMPELLER, OR KNIFE BUDDLE, in use at the following and many other Lead, Copper, Blende, and Tin Mines:—The Van, Roman Gravels, Tankerville, Ladywell, Lisburne, East Black Craig, Old Treburgett, Penhale & Barton, Bog, Linares, Fortuna, Alamillos, Minera Halvans, &c.

LONDON OFFICE: 6, QUEEN STREET PLACE, E.C.

# The "Burleigh" Rock Boring Company, Limited,

## 100, KING STREET, MANCHESTER.

**RICHARD MOTTRAM, Secretary.**

This Company Sell or Let out on Hire their **ROCK BORING MACHINERY**, or they Contract for the Execution of Rock Excavations, such as Shafts and Tunnels, by the aid of the "Burleigh" Rock Boring Machinery.

### EXTRACTS FROM RECENT TESTIMONIALS.

*JOHN ROBINSON, Talysarn, near Carnarvon.*

"The 'Burleigh' Rock Drills are working very satisfactorily, and I purpose adopting them throughout all my quarries."

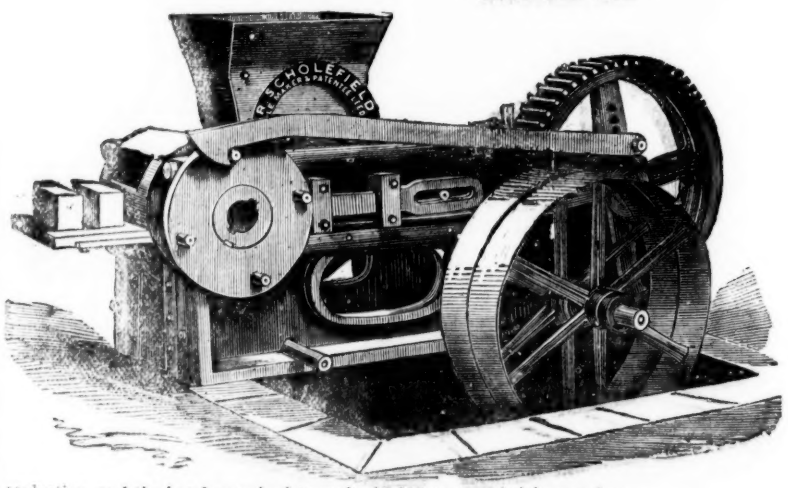
"The Dowlais Iron Company, after a severe trial, have approved of these Machines for Deep Borings in their Limestone Quarries, where they are in daily use, boring holes 18 to 20 feet deep by 3 to 4 inches diameter, operated by one of their own workmen."

**CAUTION.**—It having come to the knowledge of the Directors of this Company that certain unscrupulous persons are offering for Sale Rock Boring Machines as improvements on the "Burleigh' invention, and which Machines are Infringements of this Company's Patents, Notice is hereby given to intending Purchasers and Users that this Company will proceed at law against all Infringers of their Patent Rights, whether Makers, Vendors, or Users.

NOTICE—SEE REDUCED PRICE LISTS.

# R. SCHOLEFIELD'S
# LATEST PATENT BRICK-MAKING MACHINE.

PATENTED 1873.




R. S. begs to call the attention of all Colliery Owners in particular to his PATENT SEMI-DRY BRICK MACHINE, and the economical method of making bricks by his patent machinery from the refuse that is taken from the pits during the process of coal-getting, which, instead of storing at the pit's mouth (and making acres of valuable land useless), is at once made into bricks, at a very small cost, by R. S.'s Patent Brick-making Machinery. If the material is got from the pit hill, the following is about the cost of production, and the hands required to make 10,000 pressed bricks per day:—

| | |
|---|---|
| 2 men digging, each 4s. per day | £0 8 0 |
| 1 man grinding, 4s. 6d. per day | 0 4 6 |
| 1 boy taking off bricks from machine, and placing them in barrow ready for the kiln, 2s. per day | 0 2 0 |
| 1 boy greasing, 1s. 6d. per day | 0 1 6 |
| 1 engine-man, 5s. per day | 0 5 0 |
| 1 man wheeling bricks from machine to kiln, 4s. per day | 0 4 0 |
| Total cost of making 10,000 pressed bricks | £1 5 0, or 2s. 6d. per 1000. |

(SETTING AND BURNING SAME PRICE AS HAND-MADE BRICKS.)

N.B.—Where the material can be used as it comes from the pit, the cost will be reduced in digging.
As the above Machinery is particularly adapted for the using up of shale, bind, &c., it will be to the advantage of all Colliery Owners to adopt the use of the said Brick-making Machinery.

THE MACHINES CAN BE SEEN IN OPERATION AT THE WORKS OF THE SOLE MAKER AND PATENTEE DAILY.

SCHOLEFIELD'S ENGINEERING & PATENT BRICK MACHINE WORKS,
KIRKSTAL ROAD, LEEDS.

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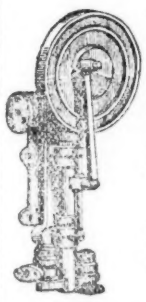

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**THE EXCELSIOR DIRECT-ACTING PUMPS.**
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**PATENT SURFACE CONDENSING ENGINES.**
**PATENT PADDLE ENGINES.**
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TO COLLIERY PROPRIETORS, MINING ENGINEERS, &c.

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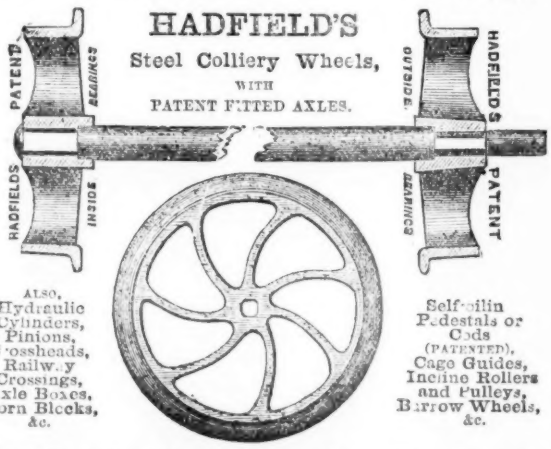


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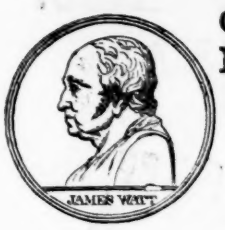


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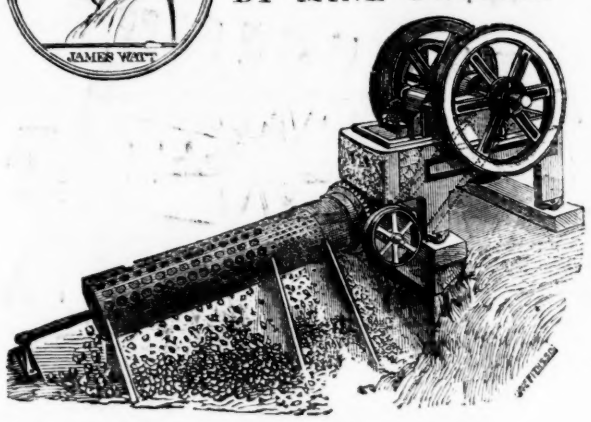

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AT ALL THE PRINCIPAL WORKS IN THE KINGDOM.
Takes in 20 in. by 9 in., and is shown by TESTIMONIALS to be breaking from 1000 to 1200 tons per day of 10 hours, at THREE HALF-PENCE PER TON.
FEW WORKING PARTS.
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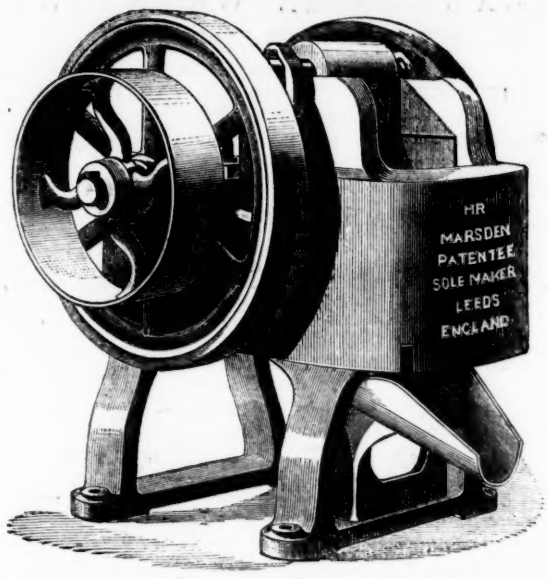
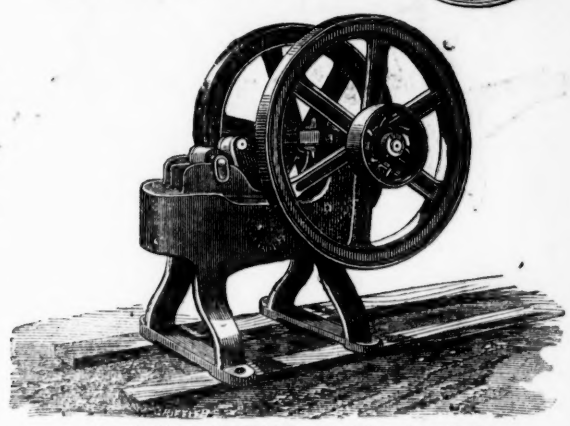
FREEDOM FROM BREAKAGE.




"The Machine is well designed, simple, but substantially made and is capable of reducing any material to fine gravel, such as copper ore, and is certainly preferable to the stamps in use for that purpose."—*Mining Journal.*

ROYAL CORNWALL POLYTECHNIC SOCIETY INSTITUTED 1833 FIRST CLASS



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For making gravel for gentlemen's walks in parks and gardens, also for grinding emery, flints, fossils, &c., for pulverising silver, copper, and other ores; also gold quartz, and especially useful to chemists and metallurgists for sampling, as it is capable of pulverising the hardest material, and can be turned by one man with ease.
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THESE STONE BREAKERS AND ORE CRUSHERS ARE UNIVERSALLY PRONOUNCED THE ONLY PERFECT SUCCESS.
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## Sole Maker & Patentee, H. R. MARSDEN, SOHO FOUNDRY, LEEDS, ENGLAND.

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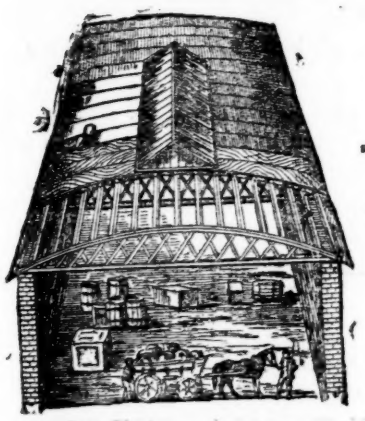

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CORPORATION STREET,
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The above drawing shows the construction of this cheap and handsome roof, now much used for covering factories, stores, sheds farm buildings, &c., the principal of which are double bow and string girders of best pine timber, sheeted with ½ in. boards, supported on the girders by purlins running longitudinally, the whole being covered with patent water-proof roofing felt. These roofs so combine lightness with strength that they can be constructed up to 100 ft. span without centre supports, thus not only affording a clear wide space, but effecting a great saving both in the cost of roof and uprights.
They can be made with or without top-lights, ventilators, &c. Felt roofs of any description executed in accordance with plans. Prices for plain roofs from 30s. to 60s. per square, according to span, size, and situation.
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DRY HAIR FELT, for deadening sound and for covering steam pipes, thereby saving 25 per cent. in fuel by preventing the radiation of heat.
PATENT ASPHALTE ROOFING FELT, price 1d. per square foot.
Wholesale buyers and exporters allowed liberal discounts.
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By a special method of preparation, this leather is made solid, perfectly close in texture, and impermeable to water; it has, therefore, all the qualifications essential for pump buckets, and is the most durable material of which they can be made. It may be had of all dealers in leather, and of—
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LONG LANE, SOUTHWARK, LONDON
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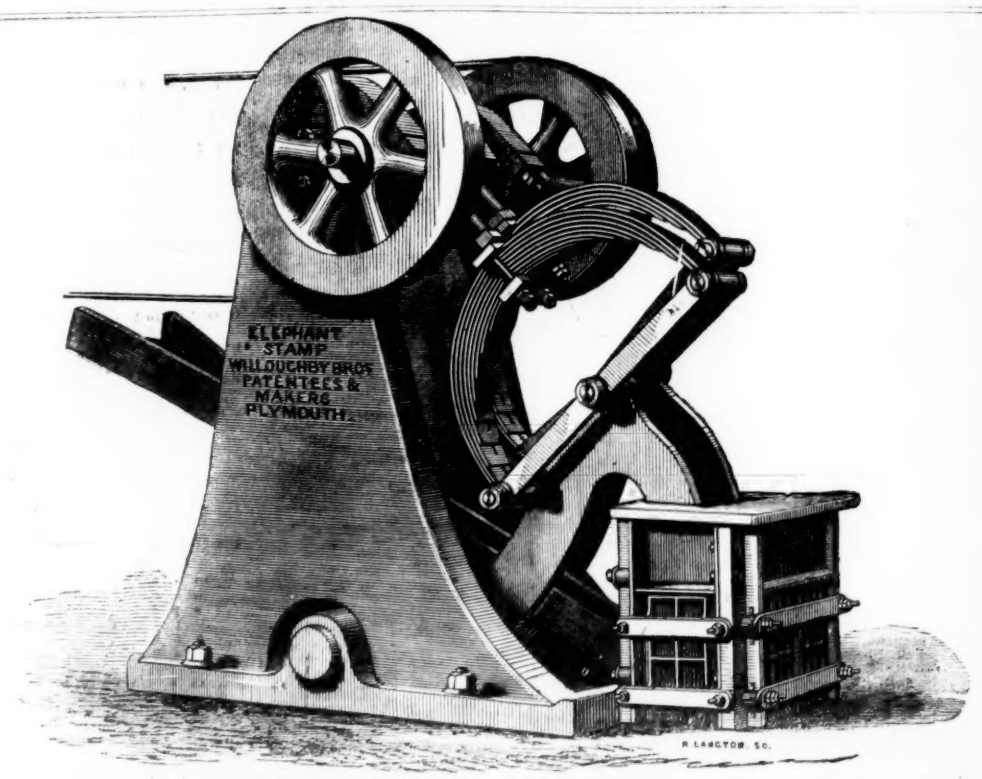


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